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TRANSACTIONS
OF THE
CONNECTICUT ACADEMY
OF
ARTS AND SCIENCES.

VOL. I, PART 1.

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NEW HAVEN:
PUBLISHED BY THE ACADEMY.

PRINTED BY E. HAYES.

1866.

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PRESENTED BY

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OF ARTS AND SCIENCES.

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Wbga/69/15

ADVERTISEMENT.

IN the year 1799, several gentlemen in New Haven formed a Society for the promotion of useful knowledge, under the name of the Connecticut Academy of Arts and Sciences; and in October of the same year, obtained from the Legislature of the State, an Act of Incorporation. Under this charter, a copy of which is subjoined, the Academy was fully organized, and has continued in active operation to the present time.

One important object proposed by the founders of the Association, was to collect materials for a statistical account of the State of Connecticut. This object was partially accomplished. A large amount of statistical facts were collected and a portion of them were published.

The main design of the Association was, however, the general promotion of the arts and sciences; and in compliance with this design, several papers on philosophical subjects were from time to time presented to the Academy, and some of them were selected for publication. In the year 1810 was issued Part I of an octavo volume, embracing seventeen short memoirs in various departments of science; and in subsequent years, eight other memoirs were added, making together an octavo volume of 412 pages. Besides this, the Academy also published some statistics of the State of Connecticut.

After the establishment of the American Journal of Science in 1819, by Professor Benjamin Silliman, the Academy judged it inexpedient to continue the publication of memoirs in a separate form, and henceforth such papers as were read at its meetings, and were considered worthy of publication, were given to the public through the medium of the Journal of Science. This practice has continued

to the present time. But within the last few years it was found that the Academy had at its command a considerable amount of scientific materials, which were thought worthy of publication, and which did not seem suited to the pages of an ordinary scientific journal. It was therefore proposed that the Academy should resume its practice of independent publication, and through the liberal subscriptions of several gentlemen of New Haven, the means of doing this have been provided. The Part now issued forms but half of a volume which it is intended before long to complete; a portion of the materials for the remainder of the volume being nearly ready for the printer.

AN ACT

TO INCORPORATE THE CONNECTICUT ACADEMY OF ARTS AND SCIENCES.

WHEREAS literary Societies have been found to promote, diffuse and preserve the knowledge of those Arts and Sciences which are the support of Agriculture, Manufactures and Commerce, and to advance the dignity, virtue and happiness of a people: Therefore,

Be it enacted by the Governor and Council, and House of Representatives, in General Court assembled, That Timothy Dwight, James Dana, Zephaniah Swift, John Allen, David Daggett, Jesse Root, John C. Smith, Isaac Beers, Nathaniel Smith, Elijah Munson, Josiah Meigs, Enoch Perkins, Jeremiah Atwater, 4th, John Barker, Elias Shipman, Noah Webster, Jr., Simeon Baldwin, Elizur Goodrich, Obadiah Hotchkiss, Jr., Timothy Pitkin, Jr., Theodore Dwight, Abraham Bishop, Ashur Miller, Stephen Titus Hosmer, James Hillhouse, Jeremiah Wadsworth, Pierpont Edwards, Isaac Mills, Eli Whitney, John Davenport, John Bowden, Bela Hubbard, Jonathan O. Moseley, Jonathan Sturgiss, Elizur Wright, Jeremiah Townsend, Jr., Jared Mansfield, John Marsh, Nathan Perkins, Levi Hart, John Treadwell, Oliver Ellsworth, Jonathan Trumbull, and Eneas Munson, and their associates, be, and they hereby are formed into, constituted and made a body politic and corporate, by the name of "*The Connecticut Academy of Arts and Sciences*," and by that name, they and their successors shall and may have perpetual succession; shall be capable of suing and being sued, pleading and being impleaded, in all suits, of what nature soever; may have a Common Seal, and may alter the same at pleasure; and may also purchase, receive, hold and convey any estate, real or personal; provided that the annual income of such estate shall not exceed one thousand dollars.

2d. *And be it further enacted,* That the said Academy may, from time to time, elect a President and a Keeper of Records, which Keeper of Records shall be sworn to a faithful discharge of his trust; and such other officers as they may find necessary or convenient; may elect additional members, provided the whole number of members resident in this State shall never exceed two hundred, nor ever be less than forty. And the said Academy may make by-laws respecting the number, qualifications and duties of their Officers; the mode of election and admission of members; the time, place and manner of holding their meetings; and the number necessary to make a quorum, and all other by-laws which they may deem necessary for the due regulation of said Society, not repugnant to the laws of the State or of the United States; and may annex reasonable pecuniary fines and penalties, for the breach of such by-laws, not exceeding ten dollars for one offence.

3d. *And be it further enacted,* That the first meeting of said Academy be held, at the State House in New Haven, on the fourth Tuesday of instant October.

4th. *And be it further enacted,* That this Act, or any part thereof, if found inadequate or inconvenient, may be altered, amended, or repealed.

Passed on the second Thursday of October, A.D. 1799.

OFFICERS OF THE ACADEMY.

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*Introductory notice to Herrick's Auroral Register by Professors
Elias Loomis and H. A. Newton, to whom the editing of Mr.
Herrick's observations was committed.*

EDWARD C. HERRICK was born in New Haven, Feb. 24th, 1811. His advantages for early education were good, and they were faithfully improved; but a chronic inflammation of the eye-lids prevented his receiving a collegiate education, which he always lamented as a disadvantage.

At the age of about sixteen he became a clerk in a book-store, and he continued in the book-business, either as clerk or proprietor, for about a dozen years. In 1843, he was appointed Librarian of Yale College, and in 1852 Treasurer of the College, which office he retained until his death, which occurred June 11, 1862.

Although Mr. Herrick was by profession a business man, he had an ardent love for science, and devoted nearly all the time which he could call his own, to the study of various subjects, but particularly Natural History and Meteorology. As early as 1832, he became deeply interested in certain questions connected with Natural History, which he prosecuted for many years with untiring zeal.

The remarkable display of meteors, Nov. 13, 1833, stimulated his curiosity, and from that time to the very close of his life, he was one of the most indefatigable observers of meteors, whether in America or in Europe.

In 1826, when only fifteen years of age, he commenced a meteorological journal, making observations with the greatest regularity four times a day, and continued it without interruption for five years. It was subsequently resumed, and continued for several years longer, though with various interruptions. In this journal, as early as 1827, he made a most scrupulous record of every aurora which he observed. The remarkable aurora of Nov. 17, 1835, combined with those of April 22, 1836, and Jan. 25, 1837, excited a deep interest among scientific men in New Haven, and stimulated Mr. Herrick to undertake that careful record of auroras which is herewith published.

In the spring of 1837, Dr. William Tully, Professor of Materia Medica in Yale College, had arranged to spend a few weeks at Castleton, Vt., a place about 125 miles north of New Haven; and Mr. Herrick made an agreement with him to observe in concert for auroras. It was decided to make a record every evening, stating whether the sky was clear or overcast; and whenever an aurora was seen, to describe its peculiarities with minuteness. Dr. Tully's record extended from March 8th to June 5th, and again from Aug. 10th to Oct. 27th. The result of these comparisons confirmed Mr. Herrick in his opinion of the utility of such a record, and henceforth his auroral register was continued for seventeen years, with only a few un-

avoidable interruptions. The most important of these interruptions was one of seven months, from March to Sept., 1851, at which time Mr. Herrick was attacked by a fit of sickness so severe that it was not supposed that he could survive it. After this sickness he never fully recovered his former physical vigor, and this consideration compelled him to abandon his systematic register in 1854.

During these seventeen years, it was Mr. Herrick's invariable custom to go out into the open air at several different times each evening, in order to see whether any traces of auroral light could be detected, and the result of his observations was entered in his register. Whenever an aurora was seen, a brief description of its principal features was given. He however regarded it as of almost equal importance that the record should show upon what nights *no* auroral light could be seen; also how far observation was interfered with by moon-light, clouds, haze, etc., and on what nights observation was from any cause rendered impossible.

In the printed register, we have generally allowed but one line to each evening. Whenever the record required a larger space, the remainder is given at the bottom of the page, and this addition is indicated by an asterisk inserted in the corresponding line.

Whenever any auroral light was seen or suspected, we have not felt at liberty to abridge the record, since Mr. Herrick was scrupulously careful in his choice of expressions; but when no light was suspected, we have abridged his descriptions of the state of the sky, so as to reduce them to the limits of a single printed line.

The numbers in parentheses at the ends of the lines are intended to indicate the auroras actually seen at New Haven. No fixed rules could be followed as regards including or excluding suspected auroras. Those cases which have been included correspond, however, with but few exceptions, to Mr. Herrick's own judgment as indicated in a numerical summary of all his observations, which he furnished to one of the committee a few years before his death.

The following abbreviations are used for words of frequent occurrence. Entries made in the Register by Mr. Herrick upon the authority of Mr. Francis Bradley are marked (F. B.).

A.B.,	Aurora Borealis.	dif.,	difficult.	obsc.,	obscured.
ac't,	account.	d'l,	doubtful.	oc'l,	occasional.
aft., after.,	afterwards.	d's,	doubtless.	oc'y,	occasionally.
alt.,	altitude.	ev'g,	evening.	pos.,	possible, possibly.
al't,	almost.	hor.,	horizon.	p., prob.,	probable, probably.
betw'n,	between.	imp., impos.,	impossible.	p'y,	partly.
c'd,	could.	impr.,	improbable.	r'y,	rainy.
cert.,	certain, certainly.	interf.,	interferes.	sl't,	slight.
cl'ded,	clouded.	l't,	light.	sl'tly,	slightly.
cl'ds,	clouds.	l'tnings,	lightnings.	susp.,	suspected.
cl'ss,	cloudless.	m'g, morn.,	morning.	twil't,	twilight.
cl'r,	clear.	m'y,	mostly.	unc.,	uncertain.
cl'y,	cloudy.	n't,	night.	vis.,	visible.
det.,	determine.	n'y,	nearly.	wh'y,	wholly.
d'g,	during.	obs.,	observation.		

A REGISTER
OF THE
A U R O R A B O R E A L I S
AT NEW HAVEN, CONN.,

FROM MARCH, 1837, TO DECEMBER, 1853.

BY EDWARD C. HERRICK,
LIBRARIAN OF YALE COLLEGE.

-
- 1837.**
- Mar. 29 Clear: a plain A.B. from end of twil't: not very conspicuous. (1)
30 Clear.
31 Raining moderately at 10^h. Began to rain at 7^h 12^m.
- Apr. 1 Clear. No A.B. seen.
2 Fair. No A.B.
3 Clear. No A.B.
4 Ov't at 6^h. Clouds breaking up at 10^h. No A.B. seen.
5 Ov't, but breaking up at 6^h. Clear at 10^h. No A.B.
6 Clear. A.B. from end of twilight. (2)
7 Ov't: began to rain about 8^h. Obs. impos.
8 Ov't at 10^h. Obs. impos.
9 Cloudy.
10 Clear. No A.B. seen.
11 Clear. No A.B.
12 Clear. No A.B.
13 Nearly ov't at 10^h. Obs. impos., or nearly.
14 Broken clouds. No A.B. seen, but obs. impaired.
15 Nearly clear. No A.B. seen.
16 Ov't. Occasional rain.
17 Nearly clear. No A.B. seen.
18 Broken cumuli. No A.B. seen.
19 Partly ov't. Clouds broken.
20 Ov't. A little rain during the evening.
21 Nearly clear. Red aurora, not very splendid. (3)
22 Clear at 10^h. No A.B.
23 Raining moderately. A few flakes of snow about 7^h.
24 Hazy.
25 Mostly ov't at 7^h. Thinly ov't at 10^h. Hazy.
26 Ov't.
27 Mostly clear, hazy.
28 Clear. Hazy.
29 Clear. Hazy in horizon.
30 Began to rain about 7^h.

1837.

- May 1 Exceedingly clear. No A.B. to 10^h.
 2 Cloudy in N. A.B. could not well have been seen to 10^h.
 3 Much ov't. No A.B. visible to 10^h, and prob. none in reality.
 4 Clear until 8^h: after that so much obsc. that A.B. could not be obs.
 5 Raining. Impos. to observe A.B. to 10^h.
 6 Mostly ov't. A.B. seen. (4)
 7 Clear, and no A.B. to 10½^h.
 8 Clear. No A.B. to 10½^h.
 9 No A.B. could have been seen on account of clouds.
 10 Clear. No A.B. to 10½^h.
 11 Nearly clear. Moonlight. No A.B. to 11^h.
 12 Ov't. Clouds prevented obs. on A.B. to 11^h.
 13 Ov't. Misty. No obs. could be made to 10^h.
 14 Ov't. No obs. c'd be made after 8½^h to 10^h. None visible before 8½^h.
 15 Ov't. No obs. could be made to 10^h, and prob. to sunrise.
 16 Ov't. No obs. could be made.
 17 Clear. Moonlight. No A.B. to 10^h.
 18 Ov't. No obs. could be made to 10^h.
 19 Rain. No obs. could be made to 10^h.
 20 Clear. Moonlight. No. A.B.
 21 Clear. No A.B. to 10^h. Apparently faint zod. light.
 22 Ov't: rain. No obs. could be made.
 23 Clear. No A.B. to 10^h. Zod. light very faint, if visible at all.
 24 Rain. No obs. could be made.
 25 Rain. No obs. could be made.
 26 Clear. No A.B. to 10^h. Zod. light appears to have departed.
 27 Clear. No A.B. to 10^h.
 28 Clear. No A.B. to 9½^h.
 29 Clear. No A.B. to 10^h.
 30 Clouding in N. at 7^h. Ov't at 10^h. No obs. could be made.
 31 Clear. Low cl'ds in N. No A.B. (or pos. very faint glimmer) to 10^h.
 June 1 Hazy: clouds in N. No A.B. to 10^h, or if any, scarcely perceptible.
 2 Mostly clear. A very good aurora. (5)
 3 Mostly ov't.* (6)
 4 Ov't after 8^h. Clouds prevented obs. on A.B.
 5 Clear, hazy. No A.B. to 10^h.
 6 Clear. No A.B. to 10^h.
 7 Ov't, rain. Obs. impos. to 10^h.
 8 Ov't. Obs. impos. to 10^h.
 9 Mostly ov't. No A.B. to 10^h. Moon and cl'ds interfere somewhat.
 10 Ov't. Obs. impos.
 11 Clear. No A.B. to 10^h.
 12 Ov't, rain. Obs. impos. to 10^h.
 13 Thinly ov't. No A.B. to 10^h.
 14 Ov't. Obs. impos. to 10½^h.
 15 Ov't. Clouds dispersing at 10^h. No. A.B. visible.
 16 Ov't, slight rain. Obs. impos.
 17 Ov't. Obs. impos. to 10^h.
 18 Clear. No A.B. to 10^h.
 19 Ov't. Obs. impos. all night.
 20 Clear. No A.B. to 10½^h.

June 3d.—Flashes of lightning nearly incessant from N.W. to N.E. to 9h 30m, and perhaps longer. A.B. could not therefore be observed. [A.B. seen Sunday between 1h and 2h A. M. (4th) by Mrs. Prof. Goodrich.]

1837.

June	21	Ov't. Obs. impos. all night.	
	22	Cloudless, but hazy. No A.B. to 10 ^h .	
	23	Dimly clear in zenith, very dusky in horizon. No A.B. to 10 ^h .	
	24	Mostly ov't. Clouds almost prevented obs.: none to 10 ^h prob.* (7)	
	25	Smoky: too hazy to permit obs. to 10 ^h , and prob. all night.	
	26	Too hazy for obs. all night: a few stars in zenith visible.	
	27	Ov't. Obs. impos. to 10 ^½ ^h .	
	28	Mostly clear. No A.B. to 10 ^h .	
	29	Ov't. Obs. impos.	
	30	Clear. No A.B. to 10 ^½ ^h ; and none at 2 A. M. of 1st July.	
July	1	Clear. Splendid A.B.	(8)
	2	Clear. A.B. moderate.	(9)
	3	Mostly clear at 10 ^h . Showers in the ev'g. A.B. very moderate.	(10)
	4	Thinly ov't. Obs. uncertain. Apparently none to 10 ^h .	
	5	Ov't. Obs. impos. to 10 ^½ ^h . [None at 10 ^½ ^h .	
	6	Mostly ov't. N. sky much clouded till 11 ^h , some light through cl'ds.	
	7	Mostly ov't. Obs. uncertain to 10 ^h .	
	8	Clear. No A.B. to 11 ^h . Moonlight.	
	9	Clear. No A.B. to 10 ^½ ^h .	
	10	Clear. No A.B. to 10 ^h .	
	11	Ov't. No certain obs. could be made up to 11 ^h .*	
	12	Clear. No A.B. to 11 ^h . [and moonlight.	
	13	Clear. No A.B. to 11 ^h : obs. uncertain on account of clouds in N.	
	14	Ov't. Obs. impos. to 11 ^h .	
	15	Ov't. Obs. impos. to 10 ^h .	
	16	Clear. No A.B. to 10 ^h .	
	17	Clear. No A.B. except a segment of a single arch.	(11)
	18	Clear. No A.B. to 10 ^½ ^h .*	
	19	Ov't. Obs. impos. to 10 ^h .	
	20	Clear, with slight haze. No A.B. to 10 ^½ ^h .	
	21	Clear. No A.B. to 11 ^h .	
	22	Clear. No A.B. to 10 ^h .	
	23	Mostly ov't at 6 ^h . Mostly clear at 10 ^h . No A.B. to 10 ^½ ^h .	
	24	Ov't at 6 ^h . Mostly clear at 10 ^h . No A.B. to 10 ^h .	
	25	Mostly ov't at 6 ^h . Clear at 10 ^h . No A.B. to 10 ^½ ^h .	
	26	Clear. No A.B. to 10 ^¼ ^h .	
	27	Mostly clear. No A.B. to 10 ^½ ^h .	
	28	Ov't. Obs. impos. to 10 ^h .	
	29	A.B. seen from 9 ^h to 10 ^h , when sky became ov't.	
	30	Ov't. Obs. impos. to 11 ^h .*	(12)
	31	Clear. No A.B. (or possibly very faint light) to 10 ^½ ^h .	
Aug.	1	Clear. No A.B. to 10 ^½ ^h , or possibly a faint light.*	(13)
	2	Mostly ov't. No A.B.	
	3	Clear. A.B. visible from a little before 9 ^h .*	(14)
	4	Clear. No A.B. to 10 ^h , or possibly a faint dawn.	
	5	Clear. No A.B. to 10 ^h .	
	6	Clear. No A.B. to 10 ^h . Moon.	
	7	Raining. Obs. impos. to 10 ^h .	

June 24th.—[Aurora after 10^h 30^m; a diffuse light only seen; watched but a few minutes, and therefore a very imperfect observation (Mrs. Mary Foster's). I did not see it.]

July 11th.—Some uncertain indications of A.B. through the clouds.

July 18th.—[Mr. Chas. Rich saw at 8^h what he thinks a faint streamer.]

July 30th.—According to Dr. Hooker there was A.B. with waves, 3 A. M. of 31st.

Aug. 1st.—[Mr. Wm. Daggett says he saw an A.B. last night.]

Aug. 3d.—Principally diffuse white light; few streamers. Watched till 11^h. Returned after midnight, with more display; loftier streamers: seen by Mr. Wm. Daggett.

1837.

Aug.	8	Ov't. Rain. Obs. impos. to 10 ^h , and probably all night.	
	9	Mostly clear. No A.B. to 10 ^h . Moon.	
	10	Ov't. Obs. impos. to 10 ^h .	[parently none to 11 ^h .
	11	Clouds breaking. Obs. uncertain on ac't of clouds and moon: ap-	
	12	Mostly ov't. Obs. nearly impos. to 10½ ^h . Moon. Prob. no A.B.	
	13	Partly clear. Obs. rather uncertain on ac't of clouds and moon.*	
	14	Mostly ov't. Obs. nearly impos.; apparently none to 11 ^h .	
	15	Ov't from 8½ ^h . Obs. impos. on account of clouds. Moon.	
	16	Mostly ov't. Obs. nearly impos.; apparently none to 10 ^h . Moon.	
	17	Ov't. Obs. impos. to 10 ^h , and prob. all night.	[none to 10½ ^h .
	18	Clearing off: obs. rather unc. on ac't of cl'ds and moon: apparently	
	19	Mostly ov't. Obs. uncertain; probably none to 10½ ^h .	
	20	Mostly ov't. Obs. nearly impos.; none discoverable.	
	21	Clear. No A.B. to 10 ^h .	
	22	Clear. No A.B. to 11 ^h .	
	23	Clear at 6 ^h . Ov't at 10 ^h : soon cl'r. No A.B. to 10½ ^h . Prob. a frost.	
	24	Mostly clear. No A.B. to 10 ^h .	
	25	Mostly clear. A.B. seen from 8 ^h 40 ^m .	(15)
	26	Ov't. Rain. Obs. impos.	
	27	Clear. A.B. seen. Rank, No. 5.	(16)
	28	Clear. A.B. seen. Rank, No. 7.	(17)
	29	Mostly ov't. No A.B. seen. Cloudy after 8 ^h .*	
	30	Thickly ov't. Obs. impos. to 10 ^h .*	
	31	Mostly clear. No A.B. to 10 ^h . Probably a frost.	
Sept.	1	Mostly clear. No A.B. seen to 11 ^h . Probably a frost.	
	2	Clear except faint cirri in N. No A.B. seen to 10 ^h .	
	3	Clear. No A.B. seen to 10 ^h .	
	4	Clear. No A.B. to 10 ^h .	
	5	Mostly ov't. Clear at 9 ^h . No A.B. to 10 ^h . Moon.	
	6	Mostly ov't, thinly. No A.B. to 10 ^h .	
	7	Ov't. Obs. impos. to 10 ^h , and probably all night.	
	8	Ov't after 9¼ ^h . No A.B. to that time.	
	9	Clear. No A.B. to 10 ^h .	
	10	Mostly clear to 8½ ^h . No A.B. to that time, and prob. none to 11 ^h .	
	11	Ov't. Obs. impos. to 11 ^h .	
	12	Clear. Very slight A.B. if any. I saw none to 11 ^h .*	
	13	Clear. No A.B. to 10 ^h .	
	14	Mostly ov't, with cirri. No A.B. to 11 ^h .	
	15	Obs. rather uncertain on ac't of cl'ds and moon; prob. none to 10 ^h .	
	16	Clear. No A.B. to 10 ^h .	
	17	Mostly clear. No A.B. to 10 ^h . Moon.	
	18	Clear. No A.B. to 10 ^h . Moon.	
	19	Clear. No A.B. to 10 ^h .	
	20	Clear. A.B. not very conspicuous.	(18)
	21	A.B.	(19)
	22	Partly ov't. Obs. doubtful on account of clouds.*	(20)
	23	Clear. A.B.	(21)

Aug. 13th.—Apparently none to 10^h 30^m. Mr. Chas. Rich thinks he saw auroral light through the clouds about 11^h.

Aug. 29th.—Went to Southampton. Mr. A. B. Haile keeps record during my absence (till Sept. 4th, inclusive). I saw a faint A.B. during the evening at Southampton, L. I.

Aug. 30th.—I thought I saw an A.B. through the clouds at Southampton, but it is somewhat uncertain.

Sept. 12th.—Mr. Haile thinks he saw a single streamer, but is uncertain.

Sept. 22d.—Apparently a faint illumination, but no streamers seen. Probably was a slight aurora.

1837.

- Sept. 24 Clear. A.B. (22)
 25 Half ov't at 6^h. Mostly clear at 10^h. Obs. unc. on ac't of clouds.*
 26 Cloudy till 9^h, clear till 10^h. A very faint A.B. detected.
 27 Ov't. Obs. impos. to 10^h, and probably all night.
 28 Ov't. Obs. impos. to 11^h, and probably all night.*
 29 Ov't. Obs. impos. to 10^h, and probably all night.
 30 Rain. Obs. impos. to 10^h, and probably all night.
- Oct. 1 Clear. No A.B. to 9¹/₂^h.*
 2 Cl'y: no A.B. to 10^h. Obs. somewhat uncertain on ac't of cl'ds.
 3 Mostly clear. No A.B. to 10¹/₂^h. None at 4^h 20^m next A. M.
 4 Clear. No A.B. to 10^h.
 5 Rain. Obs. impos. to 10¹/₂^h, and probably all night.
 6 Clear. A.B. seen from 6^h 36^m to 10^h 20^m and probably later.* (23)
 7 Obs. unc. from cl'ds and moon; p. none to 10^h: cert. none over 3.
 8 Clear. No A.B. visible to 10^h. Moon.
 9 No A.B. seen to 9^h. Obs. slightly uncertain from clouds and moon.
 10 Thinly ov't. Obs. impos. to 10^h.*
 11 M'y ov't. Obs. impos. to 9^h. Mr. C. Rich thinks he saw a faint light.
 12 Obs. almost impos. to 10^h on account of clouds and moon.*
 13 Clear. No A.B. to 10^h, but uncertain on account of moon. [moon.
 14 M'y ov't: no A.B. seen: p. none to 11^h: som't unc. from cl'ds and
 15 Ov't. Obs. impos. to 10¹/₂^h.
 16 Clear. No A.B. to 10^h. [of clouds and moon.
 17 Mostly clear. No A.B. to 10^h, but obs. very uncertain on account
 18 Clear.* (24)
 19 Ov't. Obs. impos. to 10^h, and probably all night.
 20 No A.B. to 9^h.
 21 Clear. A.B. seen from 6¹/₄^h to 10^h, and probably later.* (25)
 22 Clear. A.B. seen from 6^h 10^m. (26)
 23 Clear. No A.B. to 10¹/₂^h; thick fog from 10^h. [ov't.
 24 Obs. to 9¹/₂^h unc. on ac't of cl'ds; cert. none over 2 to 9¹/₂^h: after that
 25 Entirely ov't. Obs. impos. to 10^h, and probably all night.
 26 Ov't. Rain. Obs. impos. to 10^h, and probably all night.
 27 No A.B. to 10^h, but slightly unc. on ac't of clouds: none over 3 cert.
 28 Thinly ov't, hazy: no A.B. to 10^h, obs. unc. from cl'ds: none over 3.
 29 Mostly clear: no A.B. to 10^h, but sky most of evening slightly obsc.*
 30 Ov't: obs. after 8^h impos., and previous to that nearly so; none seen.
 31 Clear.
- Nov. 1 Clear. A.B. seen; a few transient streamers, early in evening. (27)
 2 Mostly clear. No A.B. to 10^h, or possibly a very faint light.
 3 Clear. No A.B. to 9^h; moon slightly interfered: none at 4^h A. M.
 4 Obs. unc. from cl'ds and moon; none under 6 or 7 c'd be seen: p. none.

Sept. 25th.—I think there is a faint light, before 10^h.

Sept. 28th.—Mr. D. E. Sykes tells me that at Boston, Mass., two auroral arches were seen, about 8^h; they were concentric, and about 20° high. Possibly this may belong to the previous, or the succeeding Thursday.

Oct. 1st.—A faint light in the N. like the dawn at 4^h A. M. (of 2d) extending up 1° or 2°; no streamers. Zod. light distinct, extending to the nebula in Cancer, and perhaps 3° beyond it.

Oct. 6th.—Faint streamers at 6^h 36^m, and more at 10^h 20^m. Between these dates only a general diffusion of light in the N.

Oct. 10th.—At 4^h A. M. of 11th there seemed to be a very faint light in the N., but I am uncertain whether there it is unusual.

Oct. 12th.—Needle slightly disturbed, but no A.B. seen.

Oct. 18th.—A faint A.B. low in N. horizon (much of the time obscured by clouds), to 8^h 30^m, when moon interfered. No A.B. visible after this to 10^h.

Oct. 21st.—A diffuse fluctuating light. No streamers. Aurora seen Sunday morning, by Dr. N. B. Ives, between 3^h and 4^h; numerous bright short streamers.

Oct. 29th.—At 10^h thought there was a faint N. light, but not very sure.

1837.

- Nov. 5 Half clear: clouds and moon interfered.*
 6 Cl'r early in ev'g; moon: no A.B. seen: after 7½^h ov't and obs. imp.
 7 Clear. No A.B. to 10^h; moon present; no A.B. from 4 A. M. of 8th.
 8 Clear. No A.B. to 10^h.
 9 Ov't most of evening, so that obs. was impos. to 10^h and d's all n't.
 10 M'y cl'r: no A.B. to 10^h; sl'tly unc. from cl'ds, moon; no A.B. susp.
 11 Ov't and misty. Rain about 7^h. Obs. impos.
 12 Clear. A.B. (28)
 13 M'y ov't: obs. n'y impos. from cl'ds and moon: none over 7 or 8.
 14 Sky entirely ov't till 7^h and mostly so until 10^h 40^m.* (29)
 15 Clear. No A.B. to 10½^h. Moon present.
 16 Clear. No A.B. to 7½^h, when moon rose, and none seen after to 10^h.
 17 Clear.* (30)
 18 Mostly clear. A.B. from twilight to 10^h at least.* (31)
 19 Mostly ov't at 6^h. (No later record.)
 20 M'y cl'r: no A.B. to 10^h, or pos. an exceedingly faint reflection.* (32)
 21 Hazy. No A.B. to 10^h.
 22 Ov't. Obs. impos. to 10^h.
 23 Clear. No A.B. to 10^h.
 24 Ov't. Snowing. Obs. impos. to 10^h, and probably all night.
 25 Mostly ov't at 6^h: Clear at 10^h. No A.B. to 10^h.
 26 Clear. No A.B. to 9^h.
 27 Clear. No A.B. to 10^h.
 28 Clear. No A.B. to 10^h.
 29 Mostly clear. No A.B. to 10^h.
 30 Clear. Slightly hazy. No A.B. to 10^h.* (33)
 Dec. 1 Clear. Low fog. Brilliant A.B.* (34)
 2 Ov't. Misty. Obs. impos. to 10^h.
 3 Ov't most of ev'g to 10^h and prob. all n't: obs. n'y impos.: none seen.
 4 Mostly clear at 10^h. No A.B. at 10^h. Most of the evening cloudy.
 5 Ov't. A.B. seen. (35)
 6 Clear. No A.B. to 10^h.
 7 Mostly ov't. No A.B. to 9^h, after which clouds interfere.*
 8 Clear. No A.B. to 10^h.
 9 Ov't. Obs. impos. to 10^h, and doubtless all night.
 10 Ov't. Obs. impos. to 10^h, and doubtless all night.
 11 Clear. No A.B. to 9^h. Full moon.
 12 Clear. No A.B. to 9^h. [fore uncertain.
 13 Half clear at 6^h. No A.B. seen to 10^h; cloudy and moonlight, there-
 14 Clear. No A.B. to 10^h.
 15 Clear. No A.B. to 10^h. Moon.
 16 Ov't. Obs. impos. to 10^h, and doubtless all night.

Nov. 5th.—A great coronal aurora about 11h. I did not see it. Seen early in the evening at Norfolk, Conn., by Mr. R. Gaylord, but overlooked here.

Nov. 14th.—It was then clearing rapidly. Magnificent rose-red auroral light covering the entire hemisphere; brightest about 6h m. t. Needle exceedingly disturbed. [See Dec. 29th, 1842.]

Nov. 17th.—Slight A.B. to 8h or until moon rose; after which it could be seen.

Nov. 18th.—I saw no streamers; but early much diffuse reddish light; after, a distinct arch, with vertex about 5° high and dark segment beneath, all fluctuating and ever changing; loud roar of waves (probably those of the Atlantic) distinctly audible.

Nov. 20th.—Mr. J. H. Dulles and Mr. J. D. Whitney report a single streamer seen by them about 11h 50m.

Nov. 30th.—An aurora is reported to me which must have been considerable, but much obscured by clouds. I was in the house most of the evening.

Dec. 5th.—A few red streamers in N.E. about 5h 45m reaching to zenith, not much seen after; evening, especially latter part, very unfavorable. I did not see it at all.

Dec. 7th.—Yet a faint one suspected, but uncertain on account of moon.

1837.

- Dec. 17 Ov't and raining all night. Obs. impos. [tain on ac't of cl'ds.
 18 Clear at 10^h. No A.B. to 10^h. Some auroral light susp., but uncer-
 19 Ov't at 6^h: clear at 10^h. No A.B. to 10^h.
 20 Clear. No A.B. to 10^h.
 21 No A.B. all night, yet slightly uncertain on account of cloudiness.
 22 Clear. No A.B. visible.
 23 Ov't. Obs. impos. to 10^h, and doubtless all night.
 24 Clear. No A.B. to 10^h, nor from 4^h to 6^h A. M. of 25th.
 25 Mostly clear. No A.B. to 10^h.
 26 Ov't. No A.B. to 10^h, or possibly a very faint light.
 27 Mostly ov't. No A.B. seen, but obs. nearly impos. to 10^h.
 28 Clear. A.B. scarcely detected before 8½^h. (36)
 29 Partly clear. Obs. uncertain; after 10^h m'y cl'r and no A.B. visible.
 30 Clear. A.B. faint; I saw no streamers. (37)
 31 Mostly clear. No A.B. to 10^h.

1838.

- Jan. 1 Clear. No A.B. to 10^h.
 2 Ov't. Obs. impos. to 10^h.
 3 Mostly clear. No A.B. visible, but obs. rather imperfect.
 4 Obs. impos. most of ev'g and n't on ac't of cl'ds: no A.B. seen or susp.
 5 Clear. A.B. seen; not till 9^h to 10^h.* (38)
 6 Clear. No A.B. to 10^h.
 7 Very wet fog during ev'g. No A.B. seen; obs. nearly impos. to 10^h.
 8 Clear. No A.B. to 10^h.
 9 Ov't. Raining. Obs. impos. to 10^h.
 10 Clear. No A.B. to 10^h.
 11 Clear. No A.B. to 10^h.
 12 Clear. No A.B. to 10^h.
 13 Clear. No A.B. to 10^h.
 14 Ov't. Obs. impos. to 10^h, and probably all night.
 15 Clear.* (39)
 16 Mostly clear at 6^h: mostly ov't at 10^h.* (40)
 17 Clear.*
 18 Fog. Obs. impos. to 10^h, and doubtless all night.
 19 Clear. No A.B. to 10^h.*
 20 Clear. No A.B. to 10^h.
 21 Obs. nearly impos. on account of cloudiness. None suspected.
 22 Many cirrous clouds: fair. No A.B. to 10^h, and prob. all night.
 23 Ov't. Obs. doubtful on account of clouds. None suspected.*
 24 Mostly clear. A.B. seen.* (41)
 25 Ov't. Obs. impos. to 10^h, and probably all night.
 26 Clear. No A.B. to 10^h.
 27 Driving storm. Obs. impos. all night.
 28 Ov't at 6^h. Clear, in whole or in part, later.* (42)

Jan. 5th.—Many red patches and some white streamers; greatest altitude about 50°. Bright moon.

Jan. 15th.—A very faint light in the N. between 9h and 10h, but moon soon rose and obscured it.

Jan. 16th.—No A.B. during evening up to 9h 30m, when it became cloudy. Between 10h and 11h, through the broken clouds, I saw unusual light. I presume there was an aurora. [A decided aurora at 4 A. M. I did not see it.]

Jan. 17th.—No A.B. to 10h, yet a very faint light appeared to lie low in the N. about 11h. Uncertain.

Jan. 19th.—At one time I suspected there was a very faint light, but I am uncertain.

Jan. 23d.—I have since heard that a lady saw, about 10h, through breaks in the clouds, an auroral corona. Needle not inspected.

Jan. 24th.—Bright low arch; red stains in N.W.; streamers, none higher than 40°. Rank about No. 5.

Jan. 28th.—A.B. seen, chiefly between 9h and 10h; streamers about 40° high. Rank about No. 6. None visible at 4 A. M. of 29th. Seen at Buffalo, N. Y.

1838.

- Jan. 29 Clear. No A.B. seen to 10^h.
 30 Clear. No A.B. to 10^h.
 31 Clear. No A.B. to 10^h.
- Feb. 1 M'y ov't. Obs. uncertain on ac't of cl'ds and moon: none detected.
 2 Clear. No A.B. to 10^h.
 3 Ov't, snowing at 6^h: scattered clouds at 10^h. No A.B. to 10^h.* (43)
 4 Mostly clear. No A.B. to 10^h.
 5 Clear. No A.B. to 10^h.
 6 Clear. No A.B. to 10^h.
 7 Ov't. Obs. impos. to 10¹/₂^h.
 8 Clear at 6^h: mostly ov't at 10^h. Obs. nearly impos. to 11^h.*
 9 Mostly ov't. Obs. impos. to 11^h.
 10 Half clear. No A.B. to 10^h. [Mr. A. B. Haile.]
 11 Ov't. Obs. impos. to 10^h: (cl'r after 11^h; no A.B. according to
 12 Ov't. No A.B. early in evening; afterwards obs. impos. to 10^h.
 13 Raining. Obs. impos. to 10^h.
 14 Clear. No A.B.
 15 Ov't. Obs. impos. to 10^h.
 16 Ov't. Obs. impos. to 10^h, except a few minutes at 9^h; no A.B. then.*
 17 Clear. No A.B.
 18 A.B. noticed first about 10^h; seen also at 12^h and after.* (44)
 19 Clear. No A.B. to 10^h.
 20 Clear. No A.B. to 10^h.
 21 Clear. Splendid A.B. (45)
 22 Clear. A slight illumination in the N., seen by Mr. C. Rich. (46)
 23 M'y ov't: obs. n'y impos. on ac't of cl'ds and haze: none seen to 10^h.
 24 Clear. No A.B. to 10^h.
 25 Clear. No A.B. to 10^h.
 26 Clear. A very faint light in N. to 10^h, prob. a distant A.B. (47)
 27 No A.B. at 10^h, and obs. before nearly impos.: no A.B. at 4^h (28th).
 28 Clear. No A.B. to 10^h. Moon in the way.*
- March 1 Clear. No A.B. to 10^h.
 2 Clear. No A.B. to 10^h.
 3 Clear. No A.B. to 10^h.
 4 Clear. No A.B. to 10^h.
 5 Ov't; foggy. Obs. impos. to 11^h.
 6 Ov't. Obs. nearly impos. all the evening to 10^h. None suspected.
 7 Ov't. Obs. impos. to 10^h, and probably all night.
 8 Ov't and snowing. Obs. impos. to 10^h.
 9 Ov't. Obs. nearly impos. during the evening.
 10 Clear. No A.B. to 10^h.
 11 Clear. No A.B. to 9^h.
 12 Clear. No A.B. to 10^h.
 13 Clear. No A.B. to 11¹/₂^h.
 14 Mostly clear, hazy. No A.B. to 9¹/₂^h.
 15 Clear at 6^h. Clear in E. at 10^h; cloudy in W. Slight A.B.* (48)
 16 Ov't. Obs. impos. to 10^h, and probably all night.
 17 Ov't. Snowing. Obs. impos.

Feb. 3d.—A.B. seen between 5 and 6 A. M. (4th); red colors: (Mr. A. R. Street.)

Feb. 8th.—Some unusual light suspected, but it is very uncertain.

Feb. 16th.—Mr. J. Huntington thinks he saw A.B. at 11^h.

Feb. 18th.—A small display, but few streamers.

Feb. 28th.—Query. A red aurora at 4^h to 5^h A. M. of March 1st?

March 15th.—Not discoverable until about 9^h. Up to 10^h, there was but little action. Not over No. 2. Watched only until 10^h.

1833.

- Mar. 18 Ov't. Obs. impos. to 10^h, and probably all night.
 19 Mostly clear at 6^h. Mostly ov't at 10^h.* (49)
 20 Mostly clear, slightly hazy. No A.B. to 10^h. Obs. uncertain.
 21 Hazy: no A.B. all night; hazy from 3^h: mod. A.B. c'd not be seen.
 22 Ov't. Obs. impos. to 10^h, and probably all night.
 23 Ov't. Misty. Obs. impos. to 11^h, and doubtless all night.
 24 Mostly ov't at 6^h. Clear at 10^h. No A.B. to 10^h.
 25 Fair. No A.B. to 9^h.
 26 Clear. No A.B. to 10^h.
 27 Snowing slightly. Obs. impos. to 10^h, and doubtless all night.
 28 Ov't. Obs. impos. to 10^h.
 29 Ov't.: obs. impos. most of ev'g; cl'r a short time at 8^h; no A.B. seen.
 30 Clear. No A.B. to 10^h. Moon interferes.
 31 Clear. No A.B. to 10^h.
 April 1 Clear. No A.B. to 9^h.
 2 Clear. No A.B.
 3 Ov't, with thick haze. Obs. nearly impos. to 10^h.
 4 No A.B. seen to 9½^h, but obs. very unc. on ac't of clouds and moon.
 5 Mostly clear. No A.B. to 10^h.
 6 Dense haze. Obs. impos. to 10^h, and probably all night.
 7 Clear at 6^h. No A.B. to 10^h.
 8 Rain storm during evening. Obs. impos.
 9 No A.B. to 10^h.
 10 Clear. No A.B. to 9½^h.
 11 Clearing at 6^h. Mostly clear at 10^h. No A.B. to 10^h.
 12 Clear. A.B., slight. No streamers detected. (50)
 13 Raining. Obs. impos.
 14 Clear. No A.B. during the evening to 9½^h.
 15 Obs. uncertain on account of clouds. Possibly a very faint light.
 16 Clear. No A.B.
 17 Thickly ov't. Obs. impos. to 11^h, and doubtless all night.
 18 Ov't. Obs. impos. to 10^h, and doubtless all night.
 19 Ov't. Obs. impos. to 12^h.*
 20 Mostly ov't at 6^h. Clear at 10^h. No A.B. to 10½^h.
 21 Thinly ov't. No A.B. seen. Cloudy about horizon.
 22 Clear. No A.B. to 10^h.
 23 Ov't. Obs. impos. to 10^h, and probably all night.
 24 Ov't at 6^h. Clear at 10^h. No A.B. to 10^h.
 25 Ov't. Obs. impos. to 10^h, and doubtless all night.
 26 Ov't: rainy. Obs. impos.
 27 Clear. No A.B. visible to 10^h. Moon however interferes.
 28 Ov't. Rain during evening. Obs. impos. to 10^h.
 29 Clear. A.B., splendid.* (51)
 30 Clear. A.B., moderate: streamers and red spots. (52)
 May 1 Partly ov't. No A.B. seen, but obs. unc. on ac't of moon and haze.
 2 Ov't: obs. impos. to 10^h, and doubtless all night: rain during night.
 3 Mostly clear. No A.B. to 12^h. Moon interferes.
 4 Ov't. Obs. impos. to 10^h, and doubtless all night.
 5 Raining. Obs. impos. to 10^h, and doubtless all night.
 6 Obs. nearly impos. on account of clouds and moon.

March 19th.—Slight A.B. between 9^h and 10^h and perhaps earlier. Clouds interfered much with observation.

April 19th.—After that mostly clear, and apparently a faint light, but uncertain.

April 29th.—Whole N. demi-hemisphere covered with streamers and spots, of red and white; streamers converged, but the corona was not distinctly formed. Rank about No. 9.

1838.

May	7	Ov't at 10 ^h : obs. then impos.; did not observe early; then pos. cl'r.	
	8	Ov't. Raining. Obs. impos. to 10 ^h , and doubtless all night.	
	9	Ov't. Obs. impos. to 10 ^h .	[moon and clouds.
	10	Rain at 6 ^h ; half clear at 10 ^h : no A.B. to 10 ^h . Obs. unc. on ac't of	
	11	Mostly clear. No A.B. to 10 ^h . Moon.	
	12	Ov't. Obs. impos. to 10 ^h .	
	13	Clear. No A.B. to 10 ^h .	
	14	Mostly clear. A.B., moderate.*	(53)
	15	Clear: hazy about horizon. No A.B.	
	16	Ov't. Obs. impos. to 12 ^h .	
	17	Ov't. Rain during night. Obs. impos. to 10 ^h , and d's all night.	
	18	Clear. No A.B. to 11 ^h .	
	19	Clear. No A.B. to 10 ^h .	
	20	Half clear: no A.B. to 9 ^h : sky som't hazy and cl'y; obs. a little unc.	
	21	Ov't. Obs. impos. to 10 ^h .	
	22	Half clear at 6 ^h ; raining at 10 ^h : obs. impos. to 11 ^h , and p. all night.*	
	23	Ov't. Obs. impos. to 10 ^h , and probably all night.	
	24	Ov't. Obs. impos. to 10 ¹ / ₂ ^h , and probably all night.	
	25	Obs. uncertain on account of clouds; pos. a faint light about 9 ^h .	
	26	Ov't. Obs. impos. to 10 ^h .	
	27	Ov't; rain between 9 ^h and 10 ^h . Obs. impos. to 10 ^h .	
	28	No A.B. to 10 ^h . Moon.	
	29	Mostly clear. No A.B. to 10 ^h . Moon.	
	30	No A.B. to 10 ^h . Moon.	
	31	Clear at 6 ^h . Obs. nearly impos. to 10 ^h on ac't of clouds and moon.	
June	1	Ov't. Obs. impos. to 10 ^h , and probably all night.	
	2	No A.B. to 10 ^h . Moon.	
	3	Clear. No A.B. to 10 ^h . Moon.	
	4	Ov't, rain. Obs. impos. to 10 ^h .	
	5	Partly ov't. Obs. nearly impos. on account of clouds and moon.	
	6	Ov't, drizzling. Obs. impos. to 10 ^h , and doubtless all night.	
	7	Clear. No A.B. to 10 ^h . Moon.	
	8	Mostly clear. No A.B. to 10 ^h . Moon.	
	9	Mostly clear. No A.B. to 10 ^h . Moon.	
	10	Clear. No A.B. to 10 ^h .	
	11	Clear. No A.B.	
	12	Half clear: obs. unc. on ac't of clouds; apparently a faint light.	
	13	Obs. uncertain early in the evening: none at 10 ^h .	
	14	Clear. No A.B. to 10 ^h .	
	15	Clear. No A.B. to 10 ^h .	
	16	Clear. No A.B. to 10 ^h .	
	17	Nearly ov't. Obs. nearly impos.	
	18	Clear. No A.B. to 10 ^h .	
	19	Clear. No A.B. to 9 ¹ / ₂ ^h .	
	20	Clear. No A.B. to 10 ^h .	
	21	Partly clear. Obs. unc. on ac't of clouds. Prob. none to 10 ^h .	
	22	Clear. No A.B. to 10 ¹ / ₂ ^h .	
	23	Ov't. Obs. impos. to 12 ^h .	
	24	Ov't. Obs. impos. to 10 ^h .	
	25	Clear. A.B., distinct: a low arch with occasional streamers.*	(54)
	26	Clear. A.B., streamers, some colored, and 40° to 50° high.	(55)

May 14th.—Chiefly a diffuse illumination about N. horizon, with occasional streamers.

May 22d.—Possibly auroral light seen through clouds.

June 25th.—Watched for a few minutes only, about 10^h 30^m.

1838.

- June 27 Ov't. Obs. impos. to 11^h on account of clouds.
 28 Mostly clear. No A.B. to 11^h. Moon.
 29 Clear. No A.B. to 11^h. Moon.
 30 Ov't. Obs. impos. to 10^h, and probably all night.
- July 1 Ov't. Obs. impos. to 10^h. Thunder storm at 3½^h A. M. (2d).
 2 Obs. n'y impos. to 10^h on ac't of cl'ds in N.; frequent lightning in N.
 3 Partly ov't. Obs. unc. to 10^h on ac't of cl'ds and moon: prob. none.
 4 M'y clear. No A.B. to 11^h, but moon and some cl'ds interf. a little.
 5 M'y ov't; frequent lightning in N.: obs. impos., or nearly so to 10^h.
 6 Clear. No A.B. to 10^h. Moon.
 7 Clear. No A.B. to 11^h. Moon.
 8 Clear. No A.B. to 10^h. Moon.
 9 Mostly clear. No A.B. to 11^h. Moon.*
 10 Mostly clear. No A.B. to 10^h. Moon. [susp. to 10^h.
 11 Frequent l'tnings in N. in the ev'g: obs. unc. on ac't of cl'ds: none
 12 Ov't. Obs. impos. to 10^h.
 13 Cl'r: no A.B. to 10^h. [A.B. at 11^h, according to Mr. A. B. H.] (56)
 14 Clear. No A.B. to 10^h.
 15 Clear: A.B., moderate, diffuse light and occasional streamers.* (57)
 16 Mostly clear. No A.B. to 10^h.
 17 Clear. No A.B. to 10^h.
 18 Ov't, rain. Obs. impos. to 10.
 19 Clear. Possibly some auroral light; very little, however, if any.
 20 Obs. impos. on account of clouds and storms.
 21 Clear. No A.B. to 10^h.
 22 Clear. No A.B. to 10^h.
 23 Clear. No A.B. to 11^h.
 24 No obs. except at 10^h, when it was partly cloudy and no A.B. susp.
 25 Clear. No A.B. to 10^h.
 26 Ov't, rain. Obs. impos.
 27 Clear: no A.B. to 10^h.* (58)
 28 Mostly ov't in N. Obs. nearly impos. to 10^h. None suspected.
 29 Clear. No A.B. to 10½^h. Moon.* (59)
 30 Clear. No A.B. to 12^h.
 31 Cloudy. Obs. impos. to 10^h.
- Aug. 1 Clear. No A.B. to 10^h. Moon.
 2 Clear. No A.B. to 10^h. Moon.
 3 Clear. No A.B. to 10^h. Moon.
 4 No obs. If conspicuous A.B. was visible I should have heard of it.
 5 " " " " "
 6 Mostly clear. No A.B. to 11^h. Moon.
 7 Mostly clear. No A.B. to 11^h. Moon.
 8 Clear. No A.B. to 10^h. Moon.
 9 Ov't. Obs. impos. to 2^h A. M. of the 10th.
 10
 11 Ov't and raining. Obs. impos. to 12^h.
 12 Clear. No A.B. to 10^h.
 13 Mostly clear. Obs. uncertain.
 14 Clear. No A.B. to 10^h. [somewhat uncertain.
 15 Obs. impos. to 9^h; partially clear about 10^h, and no A.B. seen: obs.

July 9th.—Dr. W. Tully suspected an aurora before the moon rose, but there is much uncertainty about it.

July 15th.—None above 30° altitude while I watched.

July 27th.—[A.B. seen about 11^h by Mr. A. B. Haile; streamers.]

July 29th.—A faint auroral light suspected, but uncertain. [A.B., streamers seen about 11^h by Mr. A. B. Haile.]

1838.

Aug. 16

- 17 Clear. No A.B. to 11^h.
 18 Clear. No A.B. to 10^h.
 19 Clear. No A.B. to 10^h.
 20 Ov't at 10^h; previously chiefly clear, and no A.B.
 21 Ov't. Obs. impos. to 10^h. Lightning during the evening.
 22 Partly clear.* (60)
 23 Clear. A little A.B. about midnight: none seen previously. (61)
 24 Mostly ov't. Obs. nearly impos.
 25 Raining. Obs. impos.
 26 Clear. No A.B. to 10^h. Moon sets at 9^h 55^m.
 27 Ov't. Obs. impos. to 10^h.
 28 Clear. A.B. to 10^h.* (62)
 29 Mostly ov't. Obs. impos. to 10^h.
 30 Clear. No A.B. to 10^h. Moon.
 31 Ov't. Obs. impos. to 10^h, and probably all night.

Sept.

- 1 Clear. No A.B.
 2 Clear. No A.B.
 3 Clear. No A.B. to 10^h. Moon.
 4 Clear. No A.B. Moon.
 5 Clear. Faint red stains of A.B. about 8^h.* (63)
 6 Clear. No A.B. to 10^h. Moon.
 7 Clear. Some auroral streamers, very faint. (64)
 8 Clear. No A.B. to 10^h.
 9 Clear. No A.B. to 10^h.
 10 Clear. Faint auroral light to 9½^h; about 11^h streamers. (65)
 11 Mostly ov't. Obs. nearly impos.
 12 Ov't and rain. Obs. impos.
 13 Clear. A.B. during evening and night.* (66)
 14 Clear. A.B. from end of twilight onward.* (67)
 15 Mostly ov't. A.B. seen through the broken clouds.* (68)
 16 Mostly ov't. A.B. seen through the broken clouds.* (69)
 17 Mostly ov't. A.B. seen very imperfectly through the clouds.* (70)
 18 Ov't. Obs. impos. after about 8^h. No obs. previously.
 19 Clear. No A.B.
 20 Clear. No A.B., or possibly a very faint light.
 21 Ov't. Obs. impos.
 22 Ov't. Obs. impos. to 10^h.
 23 Clear. No A.B. to 9^h. Moon begins to interfere.
 24 Clear. No A.B. to 9^h.
 25 Ov't. Obs. impos. to 9^h.
 26 Ov't. Storm from N.N.E. Obs. impos. to 10^h and all night.
 27 Ov't. Obs. impos.
 28 Ov't. Obs. impos.
 29 Clear. No A.B.
 30 Clear. No A.B., and none at 4^h A. M. of Oct. 1st.

Aug. 22d.—Some unusual light in the N. but no streamers noticed to 10^h. A faint A.B. probably. [Mr. A. B. Haile saw streamers between 10^h and 11^h.]

Aug. 28th.—Little else than a diffuse light—an occasional low streamer.

Sept. 5th.—Moon interferes greatly. Saw no streamers, but did not watch long.

Sept. 13th.—A distinct arch from 1° to 2° high in N. I saw no streamers.

Sept. 14th.—Groups of short streamers at an altitude of 40°, gliding westward. Not a very great display. (Seen at Richmond, Ky.)

Sept. 15th.—Probably not a great display.

Sept. 16th.—No streamers noticed, but a strong illumination.

Sept. 17th.—No doubt as to its existence; but much uncertainty as to its extent.

1838.

- Oct. 1 Clear. No A.B. to 9^h. Moon.
 2 Much clouded: obs. scarcely pos. on ac't of cl'ds and moon to 10^h.
 3 Clear. No A.B. to 10^h. Moon.
 4 Clear. No A.B. to 9^h. Moon.
 5 Clear. No A.B. to 10^h.
 6 Quite cloudy. No A.B. seen, but obs. unc. [any magnitude.
 7 Cl'r: no A.B. to moonrise; aft. not easy to det.; p. (at least) none of
 8 Clear. No A.B. to 9^h.
 9 Cloudy. Obs. nearly or quite impos. to 9^h.
 10 Ov't and rainy. Obs. impos.
 11 Clear to 9½^h. No A.B. to that time.
 12 Ov't. Obs. impos. to 10^h.
 13 Mostly clear. No A.B. to 9^h.
 14 Ov't. Obs. impos. to 11^h.
 15 Clear about 8^h, and after. No A.B. to 10^h.
 16 Clear. Slight auroral dawn in the north. (71)
 17 Clear. No A.B. to 9^h.
 18 Much ov't, and obs. som't unc.: no A.B. detected; prob. none to 9^h.
 19 Ov't and stormy from E. Obs. impos. to 10^h.
 20 Partly ov't: obs. unc.: a little unusual light susp., but very unc.
 21 Ov't. Obs. impos. to 9^h.
 22 Clear. No A.B. to 10^h, or at 12^h.
 23 Ov't. Obs. scarcely possible to 10^h. Probably none.
 24 Ov't and stormy. Obs. impos. to 10^h. Began to clear about 10^h.
 25 Clear. No A.B. to 10^h. Moon early part of evening.
 26 Clear. No A.B. to 11^h.
 27 Hazy. Obs. dif.; haze and moon: no great display, p. none at all.
 28 Ov't and stormy. Obs. impos. all night probably.
 29 Clear. No A.B. to 10^h. Moon interferes.
 30 Partly clear: obs. unc. on ac't of cl'ds and moon; prob. none to 10^h.
 31 Clear. No A.B. to 10^h. Moon.
- Nov. 1 Partly clear to 8^h, aft. clouds. No A.B. seen: obs. nearly impos.
 2 Clear. No A.B. to 9½^h. Full moon.
 3 M'y cl'r: no A.B. seen to 9^h, but obs. very d'l from moon and haze.
 4 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 5 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 6 Mostly clear. No A.B. to 10^h.
 7 Ov't. Obs. impos. to 10^h, and doubtless all night. [night.
 8 Ov't, very heavy rain d'g ev'g with some lightning; obs. impos. all
 9 Mostly clear. No A.B. to 9^h.
 10 Clear. No A.B. to 10^h.
 11 Ov't. Obs. nearly impos. to 9^h. None seen.
 12 Partly clear: A.B.; about 11^h several fine streamers.* (72)
 13 Ov't to 10^h. A.B. seen after 10^h.* (73)
 14 Clear. Slight A.B., diffuse light, seen to 10^h. (74)
 15 Ov't. Rainy and foggy. Obs. impos. all night.
 16 Partly clear. No A.B. to 11^h.
 17 Clear. No A.B. to 9^h.
 18 Ov't, snowing. Obs. impos. to 10^h.
 19 Clear. No A.B. to 10^h.
 20 Ov't till about 9^h. No A.B. between 9^h and 10^h Sky very clear.
 21 Clear. No A.B. to 10^h.

Nov. 12th.—Light seen all night through the clouds.

Nov. 13th.—Not very great, according to reports of others.

1838.

- Nov. 22 M'y ov't: no A.B. about 6^h; soon after that ov't, and obs. imp. to 10^h.
 23 Ov't: obs. n'y imp., oc'l breaks in cl'ds; moon interf.; prob. none.
 24 Clear. No A.B. Moon interferes.
 25 Clear. Very fine A.B.* (75)
 26 Clear. No A.B. to 10^h. Moon.
 27 Ov't, snowing. Obs. impos. to 10^h.
 28 Clear. No A.B. to 9^h. Moon.
 29 Clear. No A.B. to 9^h.
 30 Mostly clear. No A.B. to 9^h.
 Dec. 1 Ov't. Obs. impos. to 10^h.
 2 Mostly clear. No A.B. to 12^h. Moon.
 3 Mostly clear. No A.B. to 11^h.
 4 Ov't all night; snow. Obs. impos. all night, and morning of 5th.
 5 Ov't. Obs. impos. to 10^h.
 6 Clear. No A.B. all night. Shooting stars in unusual numbers.
 7 Clear. No A.B. to 10^h. Shooting stars in unusual numbers.
 8 Clear. No A.B. to 10^h.
 9 Clear till 7^h 5^m. No A.B. to that time; after that ov't.
 10 Partly clear till 7^h 1^h. No A.B. to that time; after that ov't.
 11 Ov't to 8^h, after that clear. No A.B. from 8^h to 10^h.
 12 Clear. No A.B. to 9^h 1^h.
 13 Mostly cloudy; breaking away about 10^h.* (76)
 14 Almost wholly ov't, and misty: obs. nearly impos. all night.
 15 Clear. No A.B. to 9^h.
 16 Clear. No A.B. to 9^h; or from 4^h to 5^h next morning.
 17 Ov't: snowing after 7^h 1^h. Obs. impos. to 11^h.
 18 Ov't to 10^h and obs. impos.; at 10^h clouds broken: no A.B., I think.
 19 Ov't to 9^h 1^h with oc'l breaks; obs. imp.; cl'y early on morn. of 20th.
 20 Mostly clear to 10^h; hazy toward horizon.*
 21 Ov't all evening to 10^h 1^h, except for a few minutes. No A.B. then.
 22 Clear in early part of ev'g, cl'y after.: no A.B. seen; moon present.
 23 Mostly clear. No A.B. seen to 10^h. Moon.
 24 Mostly clear. No A.B. to 10^h.
 25 Mostly ov't. Obs. nearly impos. to 10^h.
 26 Clear. No A.B. to 10^h, but moon. None at 5^h 1^h next morning.
 27 Ov't to about 10^h; after that partly clear. Moon. No A.B. seen.
 28 Ov't, thinly and thickly: obs. impos. to 10^h, and doubtless all night.
 29 Clear. No A.B. to 10^h. Moon.
 30 Cl'r to 8^h; som't cl'y aft.: no A.B. to 9^h; moon; ov't at 6^h of 31st.
 31 Clear. No A.B. to 12^h. Moon.

1839.

- Jan. 1 P'y clear to 11^h: no A.B. seen to that time: moon: ov't next morn.
 2 Ov't. Slight snow. Obs. impos. to 10^h, and probably all night.
 3 Ov't. Obs. impos. to 9^h, and probably all night.
 4 Ov't. Obs. impos. to 10^h, and probably all night.
 5 Clear to about 8^h 40^m. No A.B. to that time. Ov't afterwards.
 6 Clear. No A.B. to 10^h.
 7 Ov't, and rainy part of evening. Obs. impos. to 10^h.
 8 Very clear. Windy. No A.B. to 12^h.
 9 Ov't: obs. impos. to 9^h, and d's all night; snow during night.

Nov. 25th.—First noticed about 8^h 30^m a long arch about 15° high at vertex, quite persistent. About 9^h an outburst of streamers with much red, W. of N. No corona then. Some spots in W.N.W. besides.

Dec. 13th.—A faint light in N.; most probably an aurora.

Dec. 20th.—No A.B. seen. Moon. Overcast from 10^h, and early in morning.

1839.

- Jan. 10 Ov't to 8^h. After that very clear.* (77)
 11 Ov't from 6^h to 10^h: p'y cl'r for a short time at 10^h: obs. n'y impos.
 12 Mostly clear all evening. Very clear from 10^h. No A.B. to 11^h.
 13 Ov't. Obs. nearly or quite impos. to 11^h.
 14 Ov't from 9½^h to 11^h.* (78)
 15 Mostly cl'r: no A.B. to 11^h, or pos. a very faint light: clear at dawn.
 16 Very clear: slight A.B. about 7¼^h; a very faint diffuse l't after. (79)
 17 Mostly ov't. Obs. nearly impos. to 10^h. None suspected.*
 18 Mostly ov't. Obs. nearly impos. to 10^h. None suspected.
 19 Clear. Fine A.B. from end of twilight to 10^h at least.* (80)
 20 Hazy. Obs. nearly impos. to 10^h.
 21 Ov't to between 9^h and 10^h.* (81)
 22 Ov't and snowing all evening. Obs. impos. to 11^h.
 23 Clear. No A.B. to 12^h.
 24 Clear. No A.B. to 10^h.
 25 Ov't. Obs. impos. to 10^h, and doubtless all night.
 26 Ov't. Obs. impos. to 9½^h at least, and prob. later. [obs. impos.
 27 Ov't to 8^h, aft. m'y cl'r to 9½^h: no A.B. seen between; at other times
 28 Mostly clear. No A.B. to 10^h. Moon.
 29 Partly clear. No A.B. seen. Obs. difficult and uncertain.
 30 Mostly clear. No A.B. to 10^h. Moon.
 31 Ov't. Obs. impos. to 10½^h.
 Feb. 1 Ov't, snow. Obs. impos. to 10½^h.
 2 Clear. No A.B. to 10^h.
 3 M'y ov't: obs. nearly impos. to 10^h; none seen, and yet som't susp.
 4 Mostly clear.* (82)
 5 Very clear. No A.B. to 10^h, or (barely possible) a very faint light.
 6 Very clear. No A.B. to 10^h.
 7 Ov't to 9^h, after that clear. No A.B. to 10^h.
 8 Ov't to 11^h, and doubtless all night. Quiet rain. Obs. impos.
 9 Very clear. No A.B. to 9½^h.
 10 Ov't. No obs. possible to 9^h, and doubtless to 10^h. [after 9^h ov't.
 11 Ov't to 8^h; from 8^h to 9^h partially cl'r but hazy: no A.B. seen then;
 12 Very clear. No A.B. to 10^h.
 13 Mostly clear. No A.B. to 10^h.
 14 Clear; slightly hazy. No A.B. to 10^h.
 15 Ov't and somewhat rainy. Obs. impos. to 10^h at least.
 16 Clear to 8^h. After, ov't. No A.B. to 8^h.
 17 Ov't, and rainy. Obs. to 10^h (at least) impos.
 18 Very clear: moon: low auroral bank during most of evening. (83)
 19 M'y cl'r most of ev'g: no A.B. seen to 9½^h, but obs. unc. and difficult.
 20 Ov't. Obs. impos. to 10^h.
 21 Ov't to 10^h, and doubtless all night. Obs. impos.
 22 Ov't to 10^h, and all night. Rain during night. Obs. impos.
 23 Ov't to 9^h; partly clear at 10^h: no A.B. then visible: moon interf.
 24 Ov't to 10^h, and probably all night. Obs. impos.

Jan. 10th.—Auroral bow of much constancy and brightness. A few streamers 10° or 20° high between 9^h and 10^h.

Jan. 13th.—About 9^h, through a break in the clouds, saw some light, but probably nothing unusual. Overcast at 6^h A. M. (14th).

Jan. 14th.—A narrow strip of clear sky for about 160° around the N., very bright; doubtless an A.B. behind. Mostly overcast at 6^h A. M. (15th); some light in north.

Jan. 17th.—[Aurora Australis seen this day.—*Year Book of Facts*, 1840, p. 276.]

Jan. 19th.—Not many streamers, but many arched spots—one in horizon S. of E.

Jan. 21st.—After it cleared some auroral light, or a low bank, or arch, in north.

Jan. 22d.—Reddishness (?) of clouds about 7^h (?).

Feb. 4th.—Faint auroral light, but undoubted; from about 8^h 30^m onward.

1839.

- Feb. 25 Clear; slightly smoky. No A.B. to 10¹/₄^h. Moon.*
 26 Ov't; rain from easterly quarter. Obs. impos. to 10^h.
 27 Ov't to 9¹/₂^h; nearly clear then. No A.B. seen. Moon near the full.
 28 Ov't and raining to 11^h. Obs. impos. Snow during night.
- March 1 Clear to 7¹/₄^h (moonrise). No A.B., and none seen to 10^h.
 2 Ov't to 9¹/₂^h, and probably all night. Obs. impos. Snow storm.
 3 Very clear. No A.B. to 9¹/₂^h.
 4 Very clear. No A.B. to 10^h.
 5 Mostly clear. Faint, but decided A.B. at 8^h, and up to 10^h.* (84)
 6 Clear. No A.B. to 10^h.
 7 Clear. No A.B. to 10^h.
 8 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 9 Ov't to 9¹/₂^h, and obs. impos.; clearing at 10^h, but no A.B. seen.*
 10 Very clear. A.B. seen from dark: diffuse light with low arch.* (85)
 11 Very clear. No A.B. to 10^h.
 12 Clear. No A.B. to 10^h.
 13 Partly clear. No A.B. to 10^h.
 14 Clear. No A.B. to 10^h.
 15 Very clear. Slight A.B.* (86)
 16 Partly clear. No A.B. to 10^h, or pos. a very faint l't, but doubtful.
 17 Ov't. Obs. impos. to 10^h, and doubtless all night.
 18 Mostly ov't, and moon. Obs. nearly impos. to 10^h. None seen.
 19 Ov't. Obs. impos. to 10^h.
 20 Ov't; sleet falling. Obs. impos. to 10^h, and doubtless all night.
 21 Ov't; drizzle. Obs. impos. all night.
 22 Ov't. Obs. impos. to 10^h, and probably most of the night.
 23 Mostly ov't. Obs. impos. to 10^h. [have been detected.
 24 M'y ov't in N.: moon: obs. nearly impos. to 10^h: none but No. 1 c'd
 25 Clear. No A.B. seen to 10^h. Bright moonlight.
 26 Clear. No A.B. Bright moonlight.
 27 Mostly ov't in N. Obs. nearly impos. to 10^h: moon: none susp.
 28 Smoky: obs. n'y impos. to 10^h on ac't of this and moon: none susp.
 29 Ov't: obs. impos. to 10^h and d's all n't: rain during n't: full moon.
 30 Clear. No A.B. to 10^h.
 31 Clear. No A.B. to 10^h. Moon rose 10^m after close of twilight.
- April 1 M'y cl'r, hazy. No A.B. seen to moonrise (about 9^h), and none aft.
 2 Clear. No A.B. to 10^h.
 3 Ov't. Obs. impos. to 10^h.
 4 Clear, but hazy. No A.B. to 10¹/₂^h.
 5 Ov't. Obs. impos. to 10^h, and doubtless all night.
 6 Cl'ss, but hazy: no A.B. seen to 9¹/₂^h: obs. near hor. dif.: p. none.
 7 Mostly clear. No A.B. to 9¹/₂^h.
 8 Very clear. Very faint A.B., scarcely visible before 9^h.* (87)
 9 Mostly clear. No A.B. to 10^h.
 10 Ov't. Obs. impos. to 10^h.
 11 Densely ov't. Obs. impos. to 10^h, and d's all night: began to rain.
 12 Ov't: high wind and driving rain. Obs. impos.
 13 Ov't: rain storm from N.N.E. Obs. impos. all night.
 14 Ov't. Obs. impos. to 10^h, and doubtless all night.

Feb. 25th.—Possibly a very faint light in N., but uncertain on account of moon.

March 5th.—Streamers 40° high after 10^h, as Mr. H. L. Smith informs me.

March 9th.—Perhaps a very faint appearance of A.B.

March 10th.—I saw no streamers, but I watched only a short time.

March 15th.—A soft low light in N. quarter up to 10^h. No streamers.

April 8th.—Seen up to 10^h 10^m; merely low diffuse light.

1839.

- Apr. 15 Mostly ov't to 10^h, when about half clear. No A.B. visible then.
 16 Ov't to 10^h, and doubtless all night. Obs. impos.
 17 Ov't to 10^h, and doubtless all night. Obs. impos.
 18 Cl'r: no A.B. during the n't: moon interf. until about 1 A. M. (19th).
 19 Mostly clear. No A.B. seen to 10^h, nor at midnight.
 20 Mostly clear. No A.B. seen to 10^h. Moon.
 21 Clear: faint A.B. lying along N. horizon: I saw no streamers.* (88)
 22 Cl'r: no A.B. to 11^h, or pos. a very faint light: moon makes it unc.
 23 M'y cl'ss, hazy: no A.B. seen to 10^h, but obs. dif. on ac't of moon
 24 Ov't. Obs. impos. to 10^{½h}. [and haze.
 25 Ov't. Obs. impos. to 10^h.
 26 Mostly clear. No A.B. seen to 10^h. Moon interferes.
 27 Almost wholly ov't. Obs. impos. to 10^h.
 28 Ov't. Obs. impos. to 10^h. [ov't to 10^h, and obs. impos.
 29 Clear a few minutes at 8^h; no A.B. seen then, but twil't interf.: aft.
 30 Ov't and showery. Obs. impos. to 10^h, and doubtless all night.
- May 1 Ov't, sprinkling: obs. impos. to 10^h, and doubtless all night.
 2 Clear. No A.B. to 10^h. Thunder storm during night.
 3 Clear. No A.B. to 10^h.
 4 Clear. No A.B. to 10^h.
 5 Mostly ov't.* (89)
 6 Clear. No A.B. to 10^h.
 7 Clear. No A.B. to 9^{½h}, and none at 1^h of 8th.
 8 Ov't. Obs. impos. to 10^h. Thunder shower from 1^h to 2^h of 9th.
 9 Mostly clear in north.* (90)
 10 Clear: diffuse auroral light in N.: no streamers noticed to 11^h. (91)
 11 Clear; hazy about horizon. No A.B. to 10^h.
 12 Clear. No A.B. to 10^h.
 13 Ov't. Obs. impos. to 10^h, and doubtless all night: rain in night.*
 14 Mostly clear after 9^h. A.B. seen.* (92)
 15 Mostly clear except a bank of clouds in N. and N.W.* (93)
 16 Ov't, showery. Obs. impos. to 10^h, and probably all night.
 17 Ov't; rain during night: obs. impos. to 10^h, and prob. all night.
 18 Mostly clear; few clouds about N. Moon interferes.*
 19 Clear. No A.B. to 10^h. Moon interferes.
 20 Clear; hazy near horizon. No A.B. to 10^{½h}.
 21 Mostly ov't. Obs. impos. (unless a very extensive aurora) to 10^h.
 22 Ov't. Obs. impos. to 10^h, and probably all night. [liant.
 23 Clear to 10^h, when it became ov't. No A.B. seen to 10^h: moon bril-
 24 Ov't. Obs. impos. to 10^h, and probably all night.
 25 Clear. No A.B. to 9^{½h}. Moon brilliant.
 26 Mostly ov't. Obs. impos. to 10^h. None suspected.
 27 Ov't, and rainy. Obs. impos. to 10^h, and doubtless all night.
 28 M'y ov't: obs. n'y or quite impos. to 11^h, and d's all n't: none susp.
 29 Clear: no A.B. at 9^h: moon rose about 9^h 10^m: no A.B. seen to 10^h.

April 21st.—[Streamers were seen here however.] I saw the same appearance at 3h A. M. of 22d.

May 5th.—Through openings in clouds an unusual light appeared in N., doubtless an A.B. [Very fine display, perhaps coronal, as I hear from good authority.]

May 9th.—A faint auroral dawn visible all the evening up to 10h at least. I saw no streamers.

May 11th.—A.B. at Worcester, Mass. *Bost. Med. and Surg. Jour.*, xx, 18.

May 13th.—Is there a faint light in N. behind the clouds?

May 14th.—Streamers 20° high at times; a little red light; going on at 10h.

May 15th.—Moon low in W. A.B. undoubtedly, but mostly concealed by clouds. I saw two streamers 30° high.

May 18th.—No certain A.B. to 10h, but possibly a faint light.

1839.

- May 30 Clear. No A.B. to 10^h.
 31 Clear. A.B. seen.* (94)
- June 1 Ov't. Obs. impos. to 10^h, and probably all night.
 2 Mostly clear: clouds 10° high in W., N. and N.E.; no A.B. above.
 3 Ov't with oc'l breaks in cl'ds. Obs. impos. to 10^h, and prob. later.
 4 Ov't; began to rain at 10^h. Obs. impos. to 10^h, and d's all night.*
 5 Ov't. Obs. impos. to 10^h, and doubtless later.
 6 Beautifully cl'r and calm: A.B. seen; very slight dawn in N.* (95)
 7 Mostly clear; gradually clouding from 9^h to 10^h.* (96)
 8 Ov't. Obs. impos. to 10^h, and doubtless all night.
 9 Cl'r at 10^h except N. hor.: no A.B. vis., and p. none to 10^h 10^m.
 10 M'y cl'r, low cl'ds in N. hor.: no A.B. vis. to 11^h, and prob. none.
 11 Clear, but no A.B. to 10^h. [ing and night.
 12 M'y ov't; oc'l breaks; no A.B. then seen: obs. nearly impos. even-
 13 Ov't. Obs. impos. to 10^h, and probably later.*
 14 Clear. No A.B. to 10^h, or at 1^h of 15th. [very good.
 15 Clear. No A.B. at 11^h, and prob. none previous, but the obs. not
 16 Clear. No A.B. to 10^h.
 17 Ov't with dense haze. Obs. impos. to 10^h, and doubtless all night.
 18 Ov't to 10^h, and later. Cleared during the night.
 19 Clear. Moon interferes. No A.B. to 10¹/₂^h.
 20 Ov't about N. Obs. impos. to 10^h, and probably all night.
 21 Ov't. Obs. impos. to 10^h, and doubtless all night.
 22 Ov't. Obs. impos. to 10^h, and d's later: cleared off during night.
 23 P'y cl'ded, but an A.B. of much brightness w'd have been vis. if pres-
 24 Ov't: obs. impos. to 10^h, and p. all night. [ent: no A.B. to 10^h.
 25 Clear. No A.B. to 10¹/₄^h. Moon nearly full.
 26 Ov't in N. Obs. impos. to 10^h, and probably later.
 27 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 28 Ov't; some rain. Obs. impos. to 10¹/₂^h, and probably all night.
 29 Clear. No A.B. to 10^h. Moon rises about 10^h.
 30 Clear: no A.B. to 10^h 10^m, or perhaps there is a faint l't in N.N.W.*
- July 1 Cloudless but slightly hazy. No A.B. to 10^h.
 2 Ov't, rainy. Obs. impos. to 10^h, and doubtless all night.
 3 Mostly clear. A decided A.B.* (97)
 4 Mostly clear. No A.B. to 10^h, or possibly a very faint light.
 5 Clear. No A.B. to 10^h.
 6 Clear. No A.B. to 10^h.
 7 Clear. No A.B. to 9^h 40^m.
 8 Mostly ov't. Obs. impos. to 10^h, and doubtless later.
 9 Mostly clear. No A.B. to 11^h.
 10 Mostly ov't. Obs. impos. to 10¹/₂^h.
 11 Thunder shower during ev'g. Frequent lightning after it passed.*

May 31st.—A low ill-defined band in N., about 3° high at vertex, at 10^h; horizontal extent about 30° or 35°; little change up to 10^h. No streamers.

June 4th.—Clouds lighter near N. horizon. Are they thinner there, or is there an A.B. beyond?

June 6th.—Watched at 10^h 10^m a short time. No arch, but only a dim illumination. At 10^h 40^m Mr. E. P. Mason saw bright streamers 10° high, and arch 1° high.

June 7th.—A.B. Distinct band of illumination about 5° high; without much change to 10^h, but clouds obscured parts of it. No streamers to 10^h.

June 13th.—Mr. A. B. Haile tells me that at 11^h 5^m the clouds lifted in the N. and left a long narrow space, in which the light appeared unusual; perhaps an aurora.

June 30th.—I am uncertain, but suspect a very slight A.B.

July 3d.—Several streamers about N. 15° E., about 12° or 15° high. No others seen up to 11^h, but clouds interfere greatly.

July 11th.—Clouds breaking away about 10^h. Probably no A.B. up to 10^h 10^m, but at times I suspected a faint light.

1839.

- July 12 Clear. No A.B. to 11^h. [somewhat uncertain.
 13 Clouded, oc'l breaks: no A.B. to 10^h as far as c'd be ascertained: obs.
 14 Ov't. Obs. impos. to 10¹/₄^h.
 15 Ov't. Obs. impos. to 10^h 20^m.
 16 Clear and pleasant. No A.B. to 2^h of 17th.
 17 Very clear after about 10^h. No A.B. to 11^h.*
 18 Clear. Moon interferes. No A.B. to 10¹/₄^h.
 19 Clear. Moon interferes. No A.B. to 10^h.
 20 Ov't and showery. Obs. impos. to 10^h, and probably all night.
 21 Ov't. Obs. impos. to 10^h, and probably all night.
 22 Ov't. Obs. impos. to 10^h, and probably most of the night.
 23 Clear. Moon. No A.B. to 10^h.
 24 Ov't. Obs. impos. to 10^h, and probably most of the night.
 25 Ov't. Obs. impos. to 10^h, and doubtless later.
 26 Clear. Full moon. No A.B. to 11^h. [suspected.
 27 Very hazy. Moon dimly shining: obs. nearly impos. to 10^h: none
 28 Cloudless but hazy. Moon. Obs. uncertain. Prob. none to 10^h.
 29 P'y cl'r from 9^h to 10^h; obs. in N., obs. unc.: no A.B. seen to 10^h.
 30 Mostly clear. A.B. seen.* (98)
 31 Mostly clear. No A.B. to 10^h.*
 Aug. 1 Splendidly clear. No A.B. to 10¹/₂^h.
 2 Ov't; raining at 10^h. Obs. impos. to 11^h, and probably later.
 3 Clear. No A.B. to 10^h.
 4 Clear. No A.B. to 11^h. Somewhat hazy.
 5 Cloudless, but hazy. No A.B. to 10^h. [all night.
 6 Ov't almost entirely, and at 9¹/₂^h wholly. Obs. impos. to 11^h, and p.
 7 Clear. No A.B. to 11¹/₂^h, but partly cloudy after 10^h.
 8 Ov't. Obs. impos. to 10^h, and d's later: cl'r at 1^h: no A.B. vis.
 9 Beautifully clear.*
 10 Beautifully clear. A.B. seen. Watched till 1¹/₄^h of 11th.* (99)
 11 Much clouded. Very clear for a short time at 8¹/₂^h.*
 12 Ov't with oc'l heavy showers: obs. impos. to 10^h, and p. all night.
 13 Almost wholly ov't. Obs. impos. to 10^h, and probably later.
 14 Clear. Between 11^h and 12^h a faint light across the N. horizon.*
 15 Ov't: obs. impos. to 11^h, and p. all n't: l't streak in N., p. thin cl'ds.
 16 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 17 Ov't. Obs. impos. to 10^h, and doubtless all night.
 18 Ov't. Obs. impos. to 10^h, and probably all night.
 19 Clear. Moon interferes. No A.B. seen to 10^h.
 20 Cloudy in N. to 9^h, after that mostly clear: no A.B. to 10³/₄^h.* (100)
 21 Partly clear to 10^h; then ov't, p. all night: no A.B. present: moon.
 22 P'y cl'r: moon: no A.B. seen to 10^h, but dif. to det.: none susp.
 23 M'y cl'r to 9^h, aft. ov't, and obs. impos., p. all n't: no A.B. seen to 9^h.

July 17th.—The very faint light in N.N.W. is probably the zodiacal light, seen laterally.

July 30th.—About 9^h 25^m a single ill-defined streamer, 20° high at top, at N. 5° E. slowly drifting to W., and in five minutes had reached N. 5° W. and soon disappeared. Other slight auroral indications afterward till moonrise.

July 31st.—But at one time I suspected a faint illumination; doubtful. Tornado passed through N. part of the city at noon.

Aug. 9th.—Watched till 2^h 10^m (of 10th) for meteors, which were abundant. A faint light in N.N.W. and N.—perhaps auroral, more probably zodiacal.

Aug. 10th.—A streamer about 11^h, and zones; arch and diffuse light afterwards.

Aug. 11th.—At 10^h nearly overcast. An auroral light suspected at various times, but uncertain. I did not myself look for it during the clearest part of the evening.

Aug. 14th.—It is probably auroral. Nothing previous. No streamers and possibly zodiacal light.

Aug. 20th.—Mr. F. Bradley thinks there was an A.B. but no streamers.

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- Aug. 24 Ov't and cl'r by turns, mostly the former: no A.B. seen to 10 $\frac{1}{2}$ ^h, but
 25 Clear. Moon. No A.B. to 10^h. [most of time obs. impos.
 26 M'y ov't: obs. impos., owing to cl'ds and moon, to 10^h, and p. all n't.
 27 M'y cl'r to 9^h, ov't to 10^h, p. all n't: no A.B. to 9^h; obs. obstructed.
 28 Mostly ov't, but partly clear in north.* (101)
 29 Ov't. Obs. impos. to 10^h, and p. all night: northeaster coming on.
 30 Ov't: a violent wind and rain: obs. impos. to 10^h, and d's all n't.
 31 Very clear.* (102)
 Sept. 1 Very clear. A.B. seen.* (103)
 2 Cl'r, some haze in hor.: no A.B. to 11^h: aft. 9^h Mr. A. B. H. watched.
 3 Magnificent A.B. covering at times n'y the whole heavens.* (104)
 4 Densely ov't. Obs. impos. to 9^h, and doubtless all night.*
 5 Clear. No A.B. to 10^h, or at 4^h of 6th.
 6 Very cloudy during ev'g. No A.B. seen to 9 $\frac{1}{2}$ ^h. Obs. som't unc.
 7 Ov't. Obs. impos. to 10^h, and probably all night.
 8 Ov't. Obs. impos. to 10^h, and doubtless all night.
 9 Clear. No A.B. to 11 $\frac{1}{2}$ ^h.
 10 Clear. No A.B. to 10^h.
 11 Clear and cloudy by turns.*
 12 Clear and cloudy by turns.*
 13 Clear. No A.B. to 10^h.
 14 Clear. A.B. seen.* (105)
 15 Clear. A.B. seen.* (106)
 16 Many clouds: moonlight. Obs. nearly impos. to 10^h.*
 17 Ov't nearly all evening. Partly clear at 8^h.* [am informed.
 18 Cl'ed between 9^h and 10^h. No A.B. seen to 10^h, nor to 11^h, as I
 19 Clear. Moon interferes.* (107)
 20 Clear. No A.B. to 10^h.
 21 Smoky, misty and somewhat cloudy: no A.B. seen to 9^h.* (108)
 22 Ov't to 9^h. Obs. impos.
 23 Clear. No A.B. to 10^h.
 24 Ov't. Obs. impos. to 10^h, and doubtless later.
 25 Ov't. Obs. impos. to 9 $\frac{1}{2}$ ^h, and probably all night.
 26 Clear. No A.B. to 9 $\frac{1}{2}$ ^h. Moon rose about 7 $\frac{1}{2}$ ^h.
 27 Ov't; rain. Obs. impos. to 10^h, and doubtless later.
 28 Mostly clear. A fine A.B.; not much seen before 9^h.* (109)

Aug. 28th.—A decided A.B. reported by divers persons, but I was engaged within doors, and did not see it. Streamers seen, but probably not very high.

Aug. 31st.—An A.B. seen about 9^h; several faint streamers for a few minutes; afterwards a diffuse light only to 10^h.

Sept. 1st.—Diffuse light; several faint streamers, some 10° high about 10^h: no arch seen to 10^h.

Sept. 3d.—Visible as early as 7^h 15^m, and as late as 4^h A. M. of 4th.

Sept. 4th.—Mr. W. C. Redfield informs me that at Albany, N. Y., it was partly clear, and there was visible a plain auroral segment for some time. He saw no streamers.

Sept. 11th.—Tolerably good opportunity for observation. Faint A.B. suspected to 10^h, but uncertain.

Sept. 12th.—Tolerably good opportunity for observation. No A.B. to 11^h, or possibly a faint illumination.

Sept. 14th.—About 10^h a low bright band of light lying along the North. About midnight more light, and streamers 20° high. At 3^h A. M. of 15th, Mr. L. A. Daggett tells me that A.B. was brilliant, but no higher than 30°.

Sept. 15th.—No streamers seen to 10^h, but not well watched; a band of strong light; up to 10^h there was no light higher than about 20°.

Sept. 16th.—Possibly a faint auroral light, but doubtful.

Sept. 17th.—Some faint auroral light suspected, but quite doubtful.

Sept. 19th.—A.B. seen, but slight; about 9^h a few streamers 15° high about N. 20° E. Did not observe for more than 15 minutes.

Sept. 21st.—On account of clouds and moon, observation very unsatisfactory. [A decided A.B. between 9^h and 10^h. Seen by Mr. F. Bradley.]

Sept. 28th.—At 11^h an arch 25° high, and much general light. Moon then two hours high.

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- Sept. 29 Clear. No A.B. to 10^h.
 30 Ov't; rainy to 9½^h. Obs. impos. [uncertain.]
- Oct. 1 M'y cl'r, but some cl'ds about N.: no A.B. seen to 10^h: obs. slightly
 2 Almost wholly ov't. Obs. impos. to 9¾^h.
 3 M'y cl'r, but some cl'ds about N.: no A.B. to 9½^h, nor at 5^h of 4th.
 4 Mostly clear. No A.B. to 10^h.
 5 Clear. No A.B. to 9¼^h.
 6 Partly clear. No A.B. to 10^h, but obstructed and slightly unc.
 7 Partly clear. No A.B. to 11^h. Obs. tolerably good.
 8 Cloudless, but hazy. A very faint A.B. about 8^h.* (110)
 9 Cl'dless, but hazy: no A.B. to 9^h, or pos. a very faint light about 9^h.
 10 Cloudy and clear by turns. A decided A.B., but faint.* (111)
 11 Cloudy about N., and obs much embarrassed.* (112)
 12 Ov't. Obs. impos. to 9^h, and probably all night.
 13 Cl'r at 6^h, but soon obs. by mist: obs. impos. to 9^h, and p. all n't.
 14 Rainy. Obs. impos. to 10^h, and doubtless all night.
 15 P'y cl'dy: moon: no A.B. susp. to 10^h: none from 2^h to 5^h of 16th,
 16 Clear. Moon. No A.B. to 10^h. [sky being clear.]
 17 Clear. Moon. No A.B. to 9^h.
 18 Ov't. Obs. impos. to 9^h, and doubtless all night.
 19 Mostly ov't. Obs. nearly or quite impos. to 9^h.
 20 Clear. Moon. No A.B. to 9^h.
 21 Clear. Moon. No A.B. to 10½^h.*
 22 Clear: moon: A.B.; being occupied, did not obs. it much.* (113)
 23 Cloudless, but smoky. Moon. No A.B. seen to 9^h, but obs. unc.
 24 Cloudy and very smoky. Obs. impos. to 9½^h.
 25 Clear. No A.B. to 10^h.
 26 Cl'ss, but hazy. No A.B. to moonrise, and none seen after to 9½^h.
 27 Cloudless, but hazy. No A.B. to 9½^h.
 28 Clear, but foggy near horizon. No A.B. to 9½^h.
 29 Mostly clear. No A.B. to 9½^h.
 30 Ov't. Obs. impos. to 10^h, and doubtless later.
 31 Rainy: obs. impos. to 10^h: lighter in N., p. from thinness of cl'ds.
- Nov. 1 Mostly clear at 6^h, then ov't to 11^h: no A.B. at 6^h; aft. obs. impos.
 2 Clear. A long low cloud along N. horizon.*
 3 Ov't to 9^h, and later. Obs. impos. to 9^h.
 4 Clear. Possibly a slight auroral light to 10^h, but som't unc.* (114)
 5 Violent rain and wind storm: obs. impos. to 11^h, and d's all night.
 6 Clear.* (115)
 7 Cl'r and cl'dy by turns: no A.B. to 10½^h, or pos. a very faint light.
 8 Clear. Slight A.B. during evening: no streamers to 10^h. (116)
 9 Almost entirely ov't: obs. nearly impos. to 10^h, and d's all night.*

Oct. 8th.—After that nothing seen to 10h. A decided A.B. at 3h 45m A. M. of 8th: streamers about 6° high, generally drifting to eastward.

Oct. 10th.—No streamers seen. At 3h A. M. of 11th a segment of light in N. about 2° high. No streamers.

Oct. 11th.—An unusual light suspected through breaks in the clouds, but not certain; up to 9h. Probably a faint aurora.

Oct. 21st.—[Prof. C. U. Shepard on board Great Western saw auroral display.]

Oct. 22d.—No corona. Red stains, white streamers, some 40° high.

Nov. 2d.—Above that seems to be a faint unusual light. No streamers seen. I presume it is a faint A.B.; up to 10h.

Nov. 4th.—Dr. Chas. Hooker saw an A.B. this morning, 2h A. M. Not very splendid.

Nov. 6th.—A very slight auroral dawn in N., and slightly uncertain whether it is unusual; up to 10h.

Nov. 9th.—Through breaks in clouds appeared some unusual light in N., but doubtful.

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- Nov. 10 Ov't. Obs. impos. to 10^h.
 11 Clear. A slight auroral light in N. now and then to 11^h.* (117)
 12 Ov't early part of ev'g; cl'r at 9¹/₂^h, and onward. No A.B. to 10¹/₂^h.
 13 Mostly clear to midnight. No A.B. to 11^h.
 14 Ov't, foggy. Obs. impos. to 11^h.
 15 Ov't. Obs. impos. to 11^h.
 16 Clear. Moon interferes. No A.B. to 10^h.
 17 Ov't. Obs. impos. to 10^h.* (118)
 18 Ov't. Obs. impos. to 10^h.
 19 Clear. Moon. No A.B. to 10^h. [to night.
 20 M'y cl'r aft. 7¹/₂^h; bank of cl'ds in N.: no A.B. seen to 11^h: moon full
 21 Clear. Moon. No A.B. to 9^h.
 22 Clear. Moon. No A.B. to 9^h.
 23 Partly clear at sunset and to 7^h, after which ov't.* (119)
 24 Ov't and raining. Obs. impos. to 9^h, and doubtless all night.
 25 Clear and fine. No A.B. to 9^h.
 26 Clear. No A.B. to 11^h.
 27 Clear. No A.B. to 11^h.
 28 Clear. No A.B. to 11^h.
 29 Mostly clear. No A.B. to 11^h.
 30 Mostly clear, hazy. No A.B. to 10^h.
 Dec. 1 Ov't. Obs. impos. to 9^h, and probably all night.
 2 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 3 Ov't. Obs. impos. to 10^h, and doubtless all night.
 4 Almost entirely ov't to 10^h, when it suddenly cleared up.* (120)
 5 Mostly clear. No A.B. to 11^h. [no A.B.
 6 M'y ov't aft. 7^h: obs. n'y impos. to 10^h; oc'l breaks in cl'ds: prob.
 7 Wh'y ov't to 10^h, and d's all n't: obs. impos.: N.E. rain storm com-
 8 Wholly ov't to 10^h, and d's all n't: rainy d'g the day. [ing on.
 9 Wh'y ov't and raining: obs. impos. to 10^h, and p. most or all night.
 10 Clear. Moon to 8³/₄^h. No A.B. to 10^h.
 11 Ov't and rainy after 9^h: obs. impos. to 10^h, and doubtless all night.
 12 Mostly clear after 8^h. Moon. No A.B. to 10¹/₂^h.
 13 Mostly clear. Moon. Some clouds about N.*
 14 Ov't. Obs. impos. to 9^h, and doubtless all night.
 15 Ov't, snowing: high wind from N. or N.N.W.: obs. impos. all n't.
 16 P'y cl'r after 9^h: obs. impos. before: can hear of no A.B. after that
 17 Clear. No A.B. to 10^h. Moon. [time.
 18 Clear. Moon. No A.B. to 10^h.
 19 Clear. Moon. No A.B. to 10^h.
 20 Clear. Moon. No A.B. to 10^h.
 21 Mostly ov't. Moon. Obs. uncertain. No A.B. prob. to 10^h.
 22 Ov't and snowing. Obs. impos. to 10^h.
 23 Ov't and snowing. Obs. impos. to 10^h.
 24 Ov't. Obs. impos. to 10^h.
 25 Clear. No A.B. to 10^h.
 26 Clear. No A.B. to 11^h.
 27 Snowing and raining. Obs. impos. to 10^h, and doubtless all night.

Nov. 11th.—Possibly not unusual, but probably an A.B. Apparently an unusual light from 10^h to 11^h in W. near horizon.

Nov. 17th.—At 2^h A. M. of 18th Dr. J. G. Percival saw an A.B.; an arch and some streamers.

Nov. 23d.—A considerable A.B., beginning at 5^h 30m. Reddish light 40° high; few streamers. Bright white light after.

Dec. 4th.—A slight A.B. between 10^h and 11^h probably.

Dec. 13th.—A slight A.B. suspected, but very uncertain; up to 10^h.

1839.

- Dec. 28 Mostly ov't, clearing: p. no A.B. to 10^h; obs. unc. on ac't of cl'ds.
 29 Mostly ov't. Obs. nearly impos. to 10^h.
 30 Mostly clear. No A.B. to 11^h.
 31 Clear. No A.B. to 12^h. [A.B. at 4^h A. M. of 1st.] (121)

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- Jan. 1 Very clear. No A.B. to midnight.
 2 Mostly clear. No A.B. to 11^h.
 3 Clear. Fine display of A.B.: not higher than 40°.* (122)
 4 Mostly ov't.* (123)
 5 Clear. A.B.* (124)
 6 Mostly clear. No A.B. to 10^h.
 7 Clear. No A.B. to 9^h.
 8 Clear. No A.B. to 9^h.
 9 Mostly clear. No A.B. to 10^h.
 10 Mostly ov't. Obs. impos. to 9^h.
 11 Ov't and snowing. Obs. impos. to 10^h, and doubtless all night.
 12 Clear. Moon interferes. No A.B. seen to 10^h.
 13 Ov't to 8^h; then clearing, and clear by 9^h. No A.B. to 9½^h.
 14 Ov't. Obs. impos. to 11^h.
 15 Cl'dy and p'y cl'r by turns: moon: obs. unc.: no A.B. susp. to 10^h.
 16 Clear. Moon. No A.B. to 11^h.
 17 Clear. Moon. No A.B. to 10^h.
 18 Clear. No A.B. to 10^h.
 19 Ov't. Obs. impos. to 10^h.
 20 Mostly ov't. Obs. impos. to 10^h.
 21 Very clear. No A.B. Moon rose at 8^h.
 22 Snowing. Obs. impos., doubtless all night.
 23 Ov't to 8½^h; afterwards clear. No A.B. to 9½^h.
 24 Clear. No A.B. to 10^h.
 25 Clear. No A.B. to 10^h.
 26 Mostly clear to 9½^h. No A.B. to 9½^h. Clouding up.
 27 Mostly clear. No A.B. to 10^h.
 28 Ov't. Obs. impos. to 11^h, and doubtless all night.
 29 Obs. impos. to 10^h, and doubtless all night: foggy and drizzling.
 30 Clearing between 8^h and 9^h. Very clear soon after 9^h.* (125)
 31 Clear early part of evening. Ov't at 8½^h, and onward.* (126)
- Feb. 1 Mostly ov't, and obs. nearly impos. to 10^h.
 2 Clear. No A.B. to 9^h.
 3 Clear. No A.B. to 10^h.
 4 Clear. No A.B. to 10^h.
 5 Mostly ov't. Obs. impos. to 10^h.
 6 Clear early part of evening; ov't at 9^h. No A.B. seen.
 7 Clear. A.B. seen.* (127)
 8 Ov't; foggy. Obs. impos. to 10^h, and doubtless all night.
 9 Ov't; raining. Obs. impos. to 10^h, and doubtless all night.
 10 Ov't. Obs. impos. to 10^h, and doubtless later.
 11 Clear. Moon. No A.B. to 10^h.
 12 Mostly ov't. Obs. nearly impos. to 10^h. None seen.

Dec. 30th.—At 11h I thought there was a very faint auroral light; uncertain.

Jan. 3d.—Much red light; streamers and arches. Most brilliant from 6h to 7h.

Jan. 4th.—Evidently some (but not great) display of A.B.; obscured by clouds.

Jan. 5th.—Not much up to 10h, but a luminous arch, not changing much, about 7° high at vertex: occasional streamers.

Jan. 30th.—Fine auroral arch low in the N. I saw no streamers. Arch 6° high at vertex.

Jan. 31st.—Low arch in N. I saw no streamers. Arch 6° high at vertex.

Feb. 1st.—A faint auroral light suspected.

Feb. 7th.—A low arch in N. with occasional streamers, not more than 25° high.

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- Feb. 13 Mostly ov't: obs. n'y impos. to 10^h: none seen: moon also interf.
 14 Ov't, misty. Obs. impos. to 10^h, and doubtless later.
 15 Clear. Moon. No A.B. to 10^h.
 16 Mostly ov't. Obs. impos. to 10^h.
 17 Mostly ov't. Moon. Obs. impos. to 10^h, and probably all night.
 18 Ov't and raining. Obs. impos. to 10^h, and doubtless much later.
 19 Thick fog. Obs. impos. to 10^h, and doubtless all night.
 20 Ov't. Obs. impos. to 10^h.
 21 Clear. Slight auroral appearances low in north.* (128)
 22 Ov't. Obs. impos. to 10^h, and doubtless all night.
 23 Ov't. Obs. impos. to 10^h, and probably all night.
 24 Much obsc. by clouds. Obs. nearly impos. to 10^h. None seen.
 25 Mostly clear. No A.B. to 10^h. Obs. som't embarrassed by cl'ds.
 26 Ov't. Obs. nearly or quite impos. to 10^h, and prob. all night.
 27 Ov't. Obs. impos. to 10^h, and doubtless all night.
 28 Ov't. Obs. impos. to 10^h. [Clear at 11^h; no A.B.: fide E. P. M.]
 29 Half clear. No A.B. to 10^h. Obs. embarrassed by clouds a little.
- Mar. 1 Ov't. Obs. impos. to 10^h, and doubtless all night.
 2 M'y ov't to 9^h, when cl'ss but hazy: no A.B. to 10^h, but obs. unc.
 3 Ov't. Obs. impos. to 10^h, and doubtless all night.
 4 Cloudless, but hazy. No A.B. to 10^h.
 5 Clear. Fine A.B.* (129)
 6 Clear. No A.B. to 10^h, or pos. a very faint light in N. about 10^h.
 7 Clear. Moon. No A.B. to 10^h.
 8 Clear. Moon. No A.B. to 9^h.
 9 Mostly clear. Moon. No A.B. to 10^h.
 10 Ov't. Obs. impos. to 10^h.
 11 Clear. Moon. No A.B. to 10^h.
 12 Clear. Moon. No A.B. to 8^h.
 13 Mostly clear; low clouds in N. Moon. No A.B. to 9^h.
 14 Mostly ov't. Obs. impos. to 9^h, and probably all night.
 15 Ov't. Obs. impos. to 9^h.
 16 Mostly clear to 9^h, then clouding over. No A.B. seen or susp.
 17 Ov't to 10^h, then clear. Moon. No A.B. to 11^h.
 18 Ov't to 10^h, and doubtless later. Obs. impos.
 19 Ov't, rainy. Obs. impos. to 10^h.
 20 Ov't. Obs. impos. to 11^h.
 21 Clear. No A.B. to 10^h.
 22 Mostly clear, but some clouds in N. No A.B. to 9^h, and p. none.
 23 Ov't to 9^h, and doubtless all night.
 24 Sleet, snow, and rain all ev'g. Obs. impos. to 10^h, and d's later.
 25 Clear.* (130)
 26 Clear.* (131)
 27 Partly clear to 8^h, then ov't. No A.B. Cloudy during night d's.
 28 Ov't entirely to 10^h, and doubtless all night. Obs. impos.
 29 Cloudless but foggy. Obs. below 25° impos. None susp. to 9^h.
 30 Ov't and rainy. Obs. impos. to 11^h.
 31 Clear.* (132)

Feb. 21st.—No streamers seen to 10^h.

March 5th.—Not seen or visible until 9h 30m: gradually increased until the low arch was very luminous. Streamers perhaps 20° high, and some red light.

March 25th.—Most of evening no auroral light, but from 9h to 10h there was a slight A.B.; dawn merely.

March 26th.—No A.B. to 9h, but about 10h there seemed to be a very faint auroral light in N.

March 31st.—Not watched before 9h, but some very faint traces of A.B. suspected up to 10h. [A splendid display at 2h 30m A. M., April 1st; reported by Mr. Willard Lyon: crimson and white streamers reached almost to zenith.]

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- April 1 Clearing in evening; clear at 9^h: faint auroral light visible. (133)
 2 Clear. No A.B. to 10^h.
 3 Mostly clear. No A.B. to 10^h.
 4 Clear. Slight auroral appearance in N. to 10¹/₂^h: moon interf. (134)
 5 Clear. Moon. No A.B. to 10^h.
 6 Clear. Moon. No A.B. to 9^h.
 7 Clear. Moon. No A.B. to 11^h.
 8 Clear. Moon. No A.B. to 10^h.
 9 Clear. Moon. No A.B. to 10^h.
 10 Clear. Moon. No A.B. to 10^h.
 11 Ov't. Obs. impos. to 11^h, and doubtless all night.
 12 Ov't and rainy. Obs. impos. to 10^h and later.
 13 Clear. Moon. No A.B. to 9^h.
 14 Ov't. Obs. impos. to 10^h.
 15 Clear. Moon. No A.B. to 10^h.
 16 Mostly clear. Moon. No A.B. to 10^h.
 17 Clear. Moon. No A.B. to 10¹/₄^h.
 18 Ov't. Obs. impos. to 10^h.
 19 Cl'r: very sl't A.B. at 9^h, and aft. to 9¹/₂^h, when I ceased obs. (135)
 20 Clear. Slight A.B. at 10^h and a little before: no streamers. (136)
 21 Clear. No A.B. to 9^h.
 22 Ov't and rainy. Obs. impos. to 10^h, and doubtless later.
 23 Partly obs. by clouds. No A.B. to 10^h apparently, and p. none.
 24 Mostly clear. A.B. beginning after twilight.* (137)
 25 Ov't. Obs. impos. to 10^h, and probably all night.
 26 Ov't. Obs. impos. to 10^h.
 27 Clear. No A.B. to 9^h.
 28 Ov't, rainy at 9^h and after. Obs. impos. to 10^h, and d's all night.
 29 Ov't and rainy. Obs. impos. to 10^h, and probably all night.
 30 Clear. No A.B. to 10^h.
 May 1 Clear.* (138)
 2 Clear. No A.B. to 10^h.
 3 Ov't and rainy. Obs. impos. to 9^h, and doubtless all night.
 4 Ov't. Obs. impos. to 10^h, and doubtless later.
 5 Ov't and rainy. Obs. impos. to 10^h, and later.
 6 Cloudy in N.: moon interferes: obs. n'y impos. to 10^h: none seen.
 7 Clear. No A.B. to 10^h. Moon.
 8 Ov't. Obs. impos. to 10^h, and doubtless all night.
 9 Ov't and rainy. Obs. impos. to 10^h, and no doubt all night.
 10 Ov't. Obs. impos. to 10^h.
 11 Mostly clear. Moon. No A.B. to 9¹/₂^h.
 12 Partly cloudy. Moon. Obs. uncertain. No A.B. seen to 9¹/₄^h.
 13 Clear. Moon. No A.B. to 9¹/₂^h.
 14 Clear, mostly. Moon. No A.B. to 9¹/₂^h. [no A.B. seen.
 15 Ov't. Obs. impos. to 10^h. Clear (I am told) between 10^h and 11^h;
 16 Clear. Moon. No A.B. to 9¹/₂^h.
 17 Clear. No A.B. to 9^h. Moon then rose. None seen after, to 9¹/₂^h.
 18 Clear, but slightly hazy. No A.B. to 9¹/₂^h.
 19 Ov't. Obs. impos. to 10^h, and doubtless all night.
 20 Ov't. Obs. impos. to 10^h, and doubtless all night. Rain in night.

April 24th.—Much diffuse light, and now and then streamers, some 20° high. Long cloud in N. obscures the low arch. [A.B. seen in Ireland same night.]

May 1st.—Apparently a faint auroral light in N. at different times up to 10^h 30^m. Some slight uncertainty as to its auroral nature. Probably the A.B.

1840.

- May 21 Ov't and rainy in ev'g. Obs. impos. to 10^h, and doubtless all n't.
 22 Mostly clear after 9^h. No A.B. to 10^h.
 23 Clear after 9^h, except long low clouds in N.*
 24 Clear. No A.B. to 9^h 40^m.
 25 Cl'r: I did not obs., but from what I can learn, prob. no A.B. to 10^h.
 26 Clear. No A.B. to 10^h.
 27 Clear. No A.B. to 10^h.
 28 Clear. No A.B. to 10^h.
 29 Hazy and somewhat cloudy. A conspicuous A.B.* (139)
 30 Clear. A.B., moderate.* (140)
 31 Mostly clear. No A.B. to 9^h $\frac{1}{2}$.
- June 1 Ov't to 10^h, and doubtless all night. Obs. impos.
 2 Ov't to 10^h, and doubtless all night. Some rain. Obs. impos.
 3 Ov't to 10^h, and no doubt all night.
 4 Ov't to 10^h, and doubtless all night.
 5 Clear. Moon interferes. No A.B. to 10^h $\frac{3}{4}$.
 6 M'y ov't: obs. n'y or quite impos. to 11^h: oc'l breaks; no A.B. seen.
 7 Ov't, a little rain in ev'g. Obs. impos. to 10^h, and prob. all night.
 8 Mostly ov't. Obs. impos. to 10^h.
 9 Clear. No A.B. to 10^h.
 10 Mostly ov't. Obs. impos. to 10^h.
 11 Partly cl'r: cl'y in N.: moon: obs. nearly or quite impos. to 10^h.
 12 Half clear. Moon. At 10^h nearly clear in N.: no A.B. seen to 10^h.
 13 Clear. Moon. No A.B. to 10^h $\frac{1}{4}$. [A.B. seen.
 14 M'y ov't. Cl'r in N. a little after 9^h; at 9^h $\frac{1}{2}$ wh'y ov't: moon: no
 15 Mostly clear. Moon interferes.*
 16 Very clear. No A.B. to 10^h $\frac{1}{4}$. Moon rose about 9^h $\frac{1}{2}$.
 17 Clear. No A.B. to 10^h.
 18 Ov't, rain in night. Obs. impos. till after midnight.
 19 Much ov't, and at 10^h almost entirely.*
 20 Clear. No A.B. to 10^h $\frac{1}{4}$.
 21 Clear. No A.B. to 11^h. Lightning in N. from 9^h to 10^h oc'y.
 22 Mostly cloudy. Obs. nearly impos. to 10^h $\frac{1}{2}$. None seen.
 23 Clear. No A.B. to 10^h $\frac{1}{4}$.
 24 Mostly clear, but slightly hazy. No A.B. to 10^h $\frac{1}{4}$. [aft. ov't.
 25 Ov't below 20°; mostly cl'r above: no A.B. seen to 9^h $\frac{1}{2}$; then and
 26 Mostly clear in N. No A.B. to 10^h.
 27 M'y ov't and wh'y so after 9^h $\frac{1}{2}$: no A.B. seen at cl'r intervals in N.
 28 Hazy. Obs. obstructed. No A.B. seen to 10^h $\frac{1}{2}$.
 29 Ov't. Obs. impos. to 10^h $\frac{1}{2}$, and doubtless all night.
 30 At 9^h ov't, and onward to 10^h $\frac{1}{4}$, and later. Obs. impos.
- July 1 Fleecy cl'ds: no A.B. seen to 11^h, p. none: at 11^h $\frac{1}{2}$ wh'y ov't in N.
 2 Ov't. Obs. impos. to 10^h, and probably all night.
 3 Ov't. Obs. impos. to 11^h $\frac{1}{2}$.
 4 Clear. Moon interferes. No A.B. to 10^h.
 5 Sky much cl'ded by cirri: moon: obs. very imperf.: none seen to 10^h.
 6 Wh'y ov't. Obs. impos. to 10^h, and d's all night. Rain in night.

May 23d.—Watched to 11h; possibly a faint auroral light, but uncertain.

May 29th.—A narrow belt overhead between 9h and 10h; and after 10h auroral waves as high as zenith.

May 30th.—About 9h 20m, several streamers 20° high.

June 15th.—I have some suspicion that there is at 9h 30m an unusual light, but am far from being certain.

June 19th.—Observation nearly impossible to 10h, probably all night. Some light among clouds in N.; possibly an A.B., but very doubtful.

1840.

- July 7 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 8 Ov't and rainy. Obs. impos. to 11^h $\frac{1}{4}$, and doubtless all night.
 9 Mostly clear after 9^h. Moon interferes. No A.B. to 10^h.
 10 Clear. Moon. No A.B. to 10^h.
 11 Hazy. Moon. Obs. embarrassed. No A.B. seen to 10^h 20^m.
 12 Thick haze; few stars visible. Obs. impos. to 10^h, and p. all night.*
 13 Ov't. Obs. impos. to 10^h, and probably all night.
 14 Clear. Moon. No A.B. to 10^h.
 15 Clear. Moon. No A.B. to 10^h $\frac{1}{2}$.
 16 Clear. A very faint auroral bank in N. susp. from 9^h to 10^h.* (141)
 17 Mostly ov't after 8^h 50^m: obs. impos. to 10^h, and prob. all night.
 18 Ov't. Obs. impos. to 10^h $\frac{1}{2}$.
 19 Clear. No A.B. to 10^h $\frac{1}{2}$.
 20 Clear. No A.B. to 10^h $\frac{1}{4}$. Faint zod. light in N. and N.N.W.
 21 Clear. No A.B. to 10^h.
 22 Clear, but somewhat hazy. No A.B. to 10^h $\frac{1}{2}$.
 23 Ov't and rainy. Obs. impos. to 10^h $\frac{1}{2}$, and doubtless all night.
 24 Clear. No A.B. to 10^h $\frac{1}{4}$, or pos. a very faint illumination; doubtful.
 25 Clear: a faint auroral light between 10^h and 11^h, and p. later.* (142)
 26 Clear. No A.B. to 10^h.
 27 Clear. No A.B. to 10^h 25^m.
 28 Mostly ov't. Obs. impos. to 10^h $\frac{1}{2}$.
 29 Clear. A.B. from 8^h $\frac{1}{2}$ onward.* (143)
 30 Hazy about hor.: no A.B. to 10^h $\frac{1}{2}$: a faint A.B. w'd not be visible.
 31 P'y cl'r for 15^m at 9^h: no A.B. then: ov't aft. and obs. impos. to 10^h,
 Aug. 1 Ov't. Obs. impos. to 10^h $\frac{1}{2}$, and prob. all night. [and p. all night.
 2 Ov't. Obs. impos. to 10^h, and probably most of night.
 3 Ov't and rainy to 1^h (4th) at least, and p. all night: obs. impos.
 4 Ov't wholly to 10^h. Clearing off about 10^h $\frac{3}{4}$. No A.B. then.
 5 Clear. Moon interferes. No A.B. to 10^h.
 6 Mostly ov't. Obs. impos. to 10^h, and probably to midnight.
 7 Clear. No A.B. to 9^h $\frac{1}{2}$. Moon interferes.
 8 Cl'y and r'y early in ev'g: after 9^h $\frac{1}{2}$ m'y cl'r: no A.B. to 10^h: moon.
 9 Beautifully clear: no A.B. d'g whole n't: moon interf. to 3^h of 10th.
 10 Clear. No A.B. to 11^h. Moon.
 11 Ov't. Thunder shower about 11^h. Obs. impos. to that time.
 12 Ov't. Obs. impos. to 10^h, and doubtless much later.
 13 Ov't and rainy to midnight, and ov't doubtless all night.
 14 Very clear. Moon interferes. No A.B. seen to 11^h.
 15 Mostly clear. No A.B. to 10^h. Moon interferes.
 16 Clear: no A.B. to 8^h $\frac{1}{2}$, when moon rose: none seen after that to 10^h $\frac{1}{2}$.
 17 Clear, but hazy near horizon. No A.B. to 10^h $\frac{1}{2}$.
 18 Clear. No A.B. to 10^h $\frac{1}{2}$.
 19 Mostly clear. A considerable A.B. from 8^h onward.* (144)
 20 Mostly clear; hazy about horizon. No A.B. seen to 10^h $\frac{1}{2}$.
 21 Clear. No A.B. to 10^h. Zod. light faintly visible in N.W. at 9^h.
 22 Clear. No A.B. to 10^h.

July 12th.—Some appearance like an auroral (?) belt seen by Prof. Olmsted between 9^h and 10^h, extending from N. to S. and overhead; drifting eastward, soon vanished. Probably not auroral.

July 16th.—Moon interferes. No streamers seen to 10^h.

July 25th.—No streamers seen. [Streamers seen before 9^h by Mr. T. Linsley.]

July 29th.—Low arch, much diffuse nebulous light, indefinite streaks as high as zenith; few streamers: watched until 10^h 30^m; light feeble; no corona formed.

Aug. 19th.—Brightest from 8^h to 9^h. Arches 15° high, but little streaming. Watched to 10^h 45^m.

1840.

- Aug. 23 Ov't. Obs. impos. to $10\frac{1}{2}^h$.
 24 Mostly clear to $9\frac{1}{2}^h$, then clouding.* (145)
 25 Clear: no A.B. to $9\frac{1}{2}^h$: zod. light in N.W. and W. by S.; very faint.
 26 Mostly ov't. Obs. impos. to 10^h .
 27 Much clouded. Obs. difficult and doubtful. Prob. none to 10^h .
 28 Much clouded, but a considerable A.B. visible to 11^h .* (146)
 29 Mostly clear. No A.B. to 11^h .* (147)
 30 Clear mostly. No A.B. to 10^h .
 31 Very clear. No A.B. to 10^h .
 Sept. 1 Hazy to 9^h , and cloudy after. No A.B. seen, and p. none to 10^h .
 2 Ov't. Obs. impos. to 10^h , and doubtless later.
 3 Clear. No A.B. to 10^h .
 4 Ov't to 10^h . Obs. impos. to 10^h , and doubtless all night.
 5 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably most of the night.
 6 Clear. Moon interferes. No A.B. to 10^h .
 7 Mostly clear. No A.B. to $9\frac{1}{2}^h$. Moon.
 8 Ov't. Obs. impos. to 10^h , and doubtless all night.
 9 Ov't. Raining at 9^h . Obs. impos. to 10^h , and doubtless later.
 10 Ov't and rainy. Obs. impos. to $9\frac{1}{2}^h$, and doubtless later.
 11 Ov't. Obs. impos. to 10^h , and later no doubt.
 12 Very clear. Moon. No A.B. to $9\frac{1}{2}^h$.
 13 Clear. Moon. No A.B. to $9\frac{1}{2}^h$.
 14 Partly cl'r to 9^h , aft. to 10^h ov't, rain: no A.B. seen, but moon interf.
 15 Clear. Moon rose at 8^h . No A.B. to 8^h , nor after to 10^h .
 16 Mostly clear. No A.B. to 10^h .*
 17 Partly clear. No A.B. to 9^h .
 18 Ov't and rainy. Obs. impos. to 9^h , and doubtless all night.
 19 Clear. A slight A.B.* (148)
 20 Cloudless but hazy. No A.B. to $9\frac{1}{2}^h$.
 21 M'y cl'r: a conspicuous A.B.: streamers 40° high at times.* (149)
 22 Clear. A.B. suspected.* (150)
 23 Cl'r: no A.B. to 10^h : do. at N. Y. (Mr. A. B. H. at N. H.: I went to
 24 Clear: no A.B. to 10^h ; same at N. Y. Mr. A. B. H. at N. H. [N.Y.)
 25 Clear: no A.B. to 10^h ; same at N. Y. Mr. A. B. H. at N. H.*
 26 Clear. No A.B. to 9^h .
 27 Partly clear. No A.B. to 9^h .
 28 Very hazy: a moderate A.B. w'd not be vis. No A.B. seen to 10^h .
 29 Very hazy: a moderate A.B. w'd not be vis. No A.B. seen to $9\frac{1}{2}^h$.
 30 Ov't. Obs. impos. to 10^h , and d's all night; rain during night.
 Oct. 1 Entirely ov't; drizzling: obs. impos. to 10^h , and d's all night.
 2 Entirely ov't, and some drizzle: obs. impos. to 10^h , and d's all night.
 3 Al't wh'y ov't to $9\frac{1}{2}^h$: moon: obs. impos. to $9\frac{1}{2}^h$, when cl'ring off.
 4 Very clear, but moon interferes. No A.B. seen to $9\frac{1}{4}^h$.*

Aug. 24th.—A.B. suspected. Singular long streaks of light in S.E., N.W., and elsewhere. [A.B. seen at Catskill, N. Y., by Prof. Olmsted, after 10^h . Streamers at 11^h .]

Aug. 28th.—An arch 40° high in N., between 10^h and 11^h : few streamers.

Aug. 29th.—At 12^h I think there was a slight A.B. Not to be seen at 1^h or 2^h A. M. of 30th.

Sept. 16th.—[Mr. Gilbert Dean, Jr., Yale College, reports that he saw about 1^h A. M. of 16th, in Dutchess Co., N. Y., a grand auroral display; a corona was formed.]

Sept. 19th.—Faint light low in N. for 15° each side of N.; not visible until 9^h ; seen to 10^h ; no streamers: not watched longer.

Sept. 21st.—Began before end of twilight; a bright band 10° or 12° high, with much diffuse light 30° high above it, all filling about 120° of horizon: dark segment beneath. Watched at intervals to 10^h ; fine display at $0^h 40^m$ A. M. of 22d.

Sept. 22d.—Some singular arcuate streaks in N. A.B. no doubt.

Sept. 25th.—Mr. C. S. Lyman saw at Manchester, Conn., an A.B. at $11^h 45^m$, but no streamers.

Oct. 4th.—At 2^h A. M. of 5th, thought there was a faint illumination in N., but it may be doubtful.

1840.

- Oct. 5 Very clear. Moon. No A.B. to 9^h.
 6 Clear. Moon. No A.B. to 10^h, nor at 4^h of 7th, moon having set.
 7 Clear: moon: no A.B. to 10^h, nor at 5^h of 8th, when moon had set.
 8 M'y cl'r: moon: no A.B. to 9¹/₂^h, when it was too cloudy for obs.
 9 Ov't, raining. Obs. impos. to 10^h, and prob. 2 or 3 hours later.
 10 Ov't. Obs. impos. to 10^h, and probably all night: rain at sunrise.
 11 Ov't to 9^h; n'y cl'r at 10^h: no A.B. then vis.: moon greatly interf.
 12 Clear. Moon. No A.B. to 10^h.
 13 Clear. Moon. No A.B. to 10¹/₄^h.
 14 Mostly clear. No A.B. to 7^h, when moon rose. None seen to 10^h.
 15 Clear. No A.B. to 8^h, when moon rose. None seen aft. to 10^h.
 16 Clear. No A.B. to 9¹/₂^h.
 17 Ov't. Obs. impos. to 10^h, and probably all night.
 18 Ov't. Obs. impos. to 10^h, and doubtless through the night.
 19 Ov't. Obs. impos. to 10^h, and prob. all night. Rainy at 5^h A. M.
 20 Ov't and rainy. Obs. impos. to 10^h, and probably all night.*
 21 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 22 Clear. A distinct A.B.* (151)
 23 Clear. A faint auroral bank about the north.* (152)
 24 Ov't. Obs. nearly or quite impos. to 10^h, and probably later.
 25 Ov't and rainy. Obs. impos. to 11^h, and d's later. [above cl'ds.
 26 Ov't to 9¹/₂^h; m'y cl'r at 10³/₄^h, except about 5° in N. hor.: no A.B. vis.
 27 Mostly cl'r, but some cl'ds about N. and oc'y elsewhere.* (153)
 28 Mostly clouded. Obs. nearly impos. to 9¹/₂^h. None seen.
 29 Ov't and stormy. Obs. impos. to 10^h, and doubtless all night.
 30 Almost wholly ov't. Obs. n'y impos. to 10^h, and p. most of night.*
 31 Clear. Moon set at 9^h 25^m. A decided A.B. then visible.* (154)
 Nov. 1 Clear. Moon interferes. No A.B. seen to 9¹/₂^h.
 2 Clear, but slightly hazy about horizon. Moon. No A.B. seen to 9^h.
 3 Ov't. Obs. impos. to 10^h, and doubtless all night.
 4 M'y obsc. by thin cl'ds: obs. n'y or quite impos. to 11^h, and p. all n't.
 5 Ov't. Obs. impos. to 10^h, and doubtless all night.
 6 Mostly ov't with thin clouds. Obs. impos. to 10^h, and d's later.
 7 Ov't. Obs. impos. to 10^h, and doubtless all night.
 8 Ov't and rainy. Obs. impos. to 10^h, and undoubtedly all night.
 9 Ov't and rainy: obs. impos. to 9³/₄^h, and d's all n't: stormy all night.
 10 Mostly ov't by thin clouds. Obs. impos. to 10^h, and p. most of n't.
 11 Al't entirely cl'y: obs. impos. to 10¹/₂^h, and p. all n't: ov't at dawn.
 12 Almost wh'y ov't to 11^h: obs. impos.: cl'y until near sunrise of 13th.
 13 Very clear. A.B. seen from 6¹/₄^h to moonrise, about 8¹/₂^h.* (155)
 14 Ov't: r'y d'g n't and at sunrise: obs. impos. to 10^h, and d's all n't.
 15 Clear. A.B. from about 6¹/₄^h onward.* (156)

Oct. 20th.—At 10^h clouds slightly broken in N., and some uncertain appearances of unusual light, but too cloudy to determine.

Oct. 22d.—An arch 2° or 3° high lying 30° or 40° along northern horizon. Some streamers 10° high, seen by Mr. A. B. Haile about 8^h.

Oct. 23d.—I did not watch long. At 9^h could not see.

Oct. 27th.—A decided A.B. most luminous about 10^h, when there was a strong light for 60° or 80° horizontal extent, and about 15° high. I saw no streamers.

Oct. 30th.—About 9^h 30^m clouds broken in N. for a short time, and there seemed to be some unusual light, but it is quite doubtful.

Oct. 31st.—Watched at intervals until 10^h. Horizon for 50° illumined 8° or 10° high. Light strong; an indistinct arch, but I saw no streamers.

Nov. 13th.—Horizon illumined for 100° about 5° or 8° high. I saw no streamers, but presume they might have been seen.

Nov. 15th.—Watched occasionally, but saw no streamers. Horizon illumined for 90° or 100°, about 5° high.

1840.

- Nov. 16 Mostly ov't to 10^h, and obs. impos.*
- 17 Mostly clear after 8^h: no A.B. to 10^h, and none from 12^h to 1^h A. M.
- 18 Ov't and snowing: obs. impos. to 10^h, and d's all night. [A.B. then.
- 19 Ov't most of ev'g; cl'r in N. just before 8^h and betw'n 9^h and 10^h: no
- 20 Clear. A.B. visible from 6¹/₄^h to 10^h, and prob. all night.* (157)
- 21 Ov't. Obs. impos. to 12^h, and doubtless all night.
- 22 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
- 23 Ov't until 9^h; soon after quite clear.* (158)
- 24 Ov't to 9¹/₂^h; aft. cl'y in N. for 30° high: obs. n'y prevented: no great
- 25 Ov't and rainy to 11^h at least; snowing at 12^h: obs. impos. [A.B.
- 26 Ov't to 9^h: cl'ring 9^h to 10^h, hazy to 10¹/₂^h: obs. n'y imp.; none seen.
- 27 Clear to 7^h, after m'y cl'y to 10¹/₂^h: no A.B. seen to 7^h, and aft. obs.
- 28 Cloudy to 7¹/₂^h, after that clear. No A.B. to 10¹/₂^h. [impos.
- 29 Ov't to 9¹/₂^h, and probably all night. Obs. impos.
- 30 Clear. No A.B. seen to 10^h, but moon interferes.* (159)
- Dec. 1 Clear. Moon interferes. No A.B. seen to 10¹/₂^h.
- 2 Cl'r: no A.B. to 10¹/₂^h, after som't cl'y in N.: no A.B. seen to 11¹/₂^h.
- 3 Scattered cl'ds to 7¹/₂^h, after that cl'r: moon: no A.B. seen to 10^h.
- 4 Wholly ov't. Obs. impos. to 9^h, and doubtless all night.
- 5 Wholly ov't to 11^h, and doubtless all night.
- 6 Wholly ov't to 9^h, and d's all night: snowing all day and ev'g.
- 7 Clear. Moon. No A.B. to 10^h.
- 8 Mostly ov't, especially in N. Moon. Obs. impos. to 10^h.
- 9 Ov't. Obs. impos. to 10^h, and prob. all night. Rain at 6^h A. M.
- 10 Clear. Moon. No A.B. to 10^h.
- 11 Clear. Moon. No A.B. to 10^h.
- 12 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
- 13 Clear. A slight A.B.; no streamers.* (160)
- 14 Clear. No A.B. to 10^h.
- 15 Ov't to 10^h, and doubtless later. Obs. impos.
- 16 Ov't and snowing from 3^h to 10^h, and after. Obs. impos.
- 17 Clear. A slight A.B. all the evening to 10¹/₂^h.* (161)
- 18 Clear. No A.B. to 10^h.
- 19 Cl'r: no A.B. to 10¹/₂^h, or perhaps at 10¹/₂^h very sl't illumination in N.
- 20 So much clouded that obs. was impos. to 10¹/₂^h at least.
- 21 Mostly clear. A.B. seen from about 6¹/₂^h to 10^h and after.* (162)
- 22 Clear. A.B. seen.* (163)
- 23 Ov't. Obs. impos. to 11^h.
- 24 Clear.* (164)

Nov. 16th.—After 10^h clear. There is apparently a faint light in N., but I am not certain.

Nov. 20th.—I watched it occasionally, but saw no streamers; the light was strong for 100° of N. horizon; arch at one time about 10° high. At 8h 10m a piece of arch whose lower edge cut β Ursæ Majoris; it was about 50° long, most E. of N. It was gone at 8h 30m. Zodiacal light faintly discernible from junction of Galaxy and bow of Serpentarius, extending to head of Capricornus; but it is quite uncertain how far it extends.

Nov. 23d.—I think there was a slight A.B. between 9h and 10h very low in N.

Nov. 30th.—At 10h 35m there is a faint auroral light in N. horizon.

Dec. 13th.—Merely a faint variable light low in N. horizon.

Dec. 17th.—About 80° of N. horizon illumined 1° or 2° high. I saw no streamers, but did not watch attentively. Zodiacal light has become quite plain: reaches indistinctly to α Arietis, but 2° more southerly.

Dec. 21st.—I watched at intervals, in all 30m or 40m. Saw only two streamers, viz. at 6h 17m to 6h 37m in Lyra. In the N. there was much diffuse light, and an arch elevated 3° to 6°, fluctuating of course, but quite distinct; arch comprised perhaps 90° of horizon.

Dec. 22d.—Being occupied could not observe until 8h 55m; at that time there was a narrow segment of an arch between γ Draconis and Mizar, well defined and constant for 15m.—See *N. H. Daily Herald* for Dec. 23d.

Dec. 24th.—During most of the evening there seemed to be a faintly luminous vapor in the N. particularly, but also more or less elsewhere. It could scarcely have been nebulous haziness. There were also singular long faintly luminous streaks, chiefly in N., but obeying no usual auroral laws. I am inclined to consider the whole as an auroral affair of little intensity.

1840.

- Dec. 25 Clear to 9^h.*
- 26 Ov't and snowing. Obs. impos. to 11^h, and all night.
- 27 Clear. No A.B. to 10¹/₂^h. Zod. l't reaches to N. Dec. 9°, R.A. 25°. (165)
- 28 Clear. Moon interferes until 9^h 20^m.*
- 29 Ov't. Obs. impos. to 10^h, and probably all night.
- 30 Ov't. Obs. impos. to 10^h, and doubtless all night.
- 31 M'y ov't. Obs. impos. to 10^h, and p. most of n't: ov't at 6¹/₂^h A. M.

1841.

- Jan. 1 Ov't and rainy in part. Obs. impos. to 11^h, and doubtless later.
- 2 Mostly clear: moon interferes: no A.B. to 10^h: clear at 5¹/₂^h A. M.
- 3 Clear. Moon. No A.B. to 9^h. No A.B. from 5^h to 6^h of 4th.
- 4 Clear. Moon. No A.B. to 9¹/₂^h.
- 5 Ov't. Obs. impos. to 11^h, and doubtless all night.
- 6 Ov't, foggy. Obs. impos. to 9^h, and doubtless all night.
- 7 Ov't, foggy and rainy. Obs. impos. to 9^h, and undoubtedly all n't.
- 8 Mostly ov't. Obs. impos. to 10¹/₂^h, and most probably all night.
- 9 Mostly ov't: moon interf.: obs. n'y impos. to 10^h, and p. all night.
- 10 Ov't; gentle rain. Obs. impos. to 11¹/₂^h, and doubtless all night.
- 11 Ov't; drizzling rain. Obs. impos. to 11^h, and doubtless later.
- 12 Mostly clear to 9^h 40^m. No A.B.: aft. wholly ov't, d's all night.
- 13 Ov't and snowing. Obs. impos. to 10^h, and doubtless all night.
- 14 Ov't entirely. Obs. impos. to 10¹/₂^h, and doubtless all night.*
- 15 Ov't. Obs. impos. to 9¹/₄^h, and doubtless later.
- 16 Wholly ov't. Obs. impos. to 10^h, and doubtless all night.
- 17 Wholly ov't. Obs. impos. to 11^h, and doubtless later.
- 18 Mostly clear, but hazy before 8^h.*
- 19 Wh'y ov't: obs. impos. to 10^h, and d's all night. [and d's all n't.
- 20 Wh'y ov't, except from 8^h to 8¹/₂^h: obs. before and aft. impos. to 11³/₄^h,
- 21 Almost wholly ov't with some rain about 10^h. Obs. impos. to 11^h.
- 22 Clear. A very faint A.B. suspected, but uncertain.* (166)
- 23 Ov't to 8¹/₂^h and after 9¹/₂^h, p. all n't: very cl'r about 9^h: no A.B. then.
- 24 Ov't and rainy until about 9^h. About 10³/₄^h clear. No A.B. then.
- 25 Ov't; snow squall between 7^h and 8^h; mostly clear at 10^h.* (167)
- 26 Ov't. Obs. impos. to 10¹/₂^h, and probably all night.
- 27 Partly ov't until 9^h, when and after mostly clear; som't misty.*
- 28 Clear. Moon interferes until 11¹/₂^h.* (168)
- 29 Ov't and raining a little. Obs. impos. to 11^h, and prob. all night.
- 30 Clear. Moon. No A.B. seen to 10^h.
- 31 Mostly clear. Moon. No A.B. seen to 10^h.
- Feb. 1 Ov't and snowing. Obs. impos. to 10^h, and d's later: cl'r in morn.
- 2 Ov't and snowing at 11^h. Obs. impos. to 11^h, and prob. all night.
- 3 Clear. Moon. No A.B. to 9¹/₄^h.
- 4 Hazy. Obs. nearly impos. to midnight. No A.B. seen.

Dec. 25th.—No A.B. to that time, although I once or twice suspected a very faint light in N., but I incline to think there was no A.B. Overcast at 10^h and after, all night probably.

Dec. 28th.—Some slight A.B. suspected, but uncertain. Between 5^h and 6^h A. M. of 29th the A.B. was visible; considerable light in N., and some streaming 6° or 10° high, with a red tinge.

Jan 14th.—A.B. reported as seen at Worcester, Mass.—See 9th Report of Mass. State Lunatic Hospital.

Jan. 18th.—At times I thought there was a very faint light; but at other times when examining critically, I could not detect any. On the whole I am uncertain, but rather suspect an occasional very faint light in N.

Jan. 22d.—Probably there is an unusual, but very faint light in N.

Jan. 25th.—A.B. then visible; a bright light in N. extending in altitude about 8°. I saw no streamers, but did not look two minutes. At 5^h A. M. of 26th the light in N. still visible.

Jan. 27th.—A very faint A.B. suspected, but quite doubtful.

Jan. 28th.—A faint auroral light suspected, but uncertain on account of moonlight; probably there is a slight aurora. Zodiacal light visible in E. up to Spica.

1841.

- Feb. 5 M'y cl'r: d'g total eclipse of moon no A.B. vis.: none seen to 10^h.
 6 Ov't. Obs. impos. to 10^{½h}, and probably all night.
 7 Clear. A very considerable A.B.* (169)
 8 Mostly clear. A distinct A.B.; a low arch in N.* (170)
 9 Snowing. Obs. impos. to 10^h, and probably all night.
 10 Clear. No A.B. to 10^h. [c'd have been detected.
 11 Hazy; obs. unc.: no A.B. seen to 10^{½h}: none but a considerable one
 12 Clear.* (171)
 13 Clear. No A.B. to 9^{½h}.
 14 Clear. No A.B. to 10^h.
 15 Mostly clear to 9^h: after that more cloudy in N. but no A.B.*
 16 Mostly ov't: obs. n'y impos. to 10^h, and p. all night: no A.B. seen.
 17 Ov't. Obs. impos. to 11^h at least.
 18 Mostly clear. No A.B. to 10^h.*
 19 Mostly clear. No A.B. to 10^{½h}.
 20 Mostly clear. No A.B. to 10^h.
 21 Ov't. Obs. impos. to 10^h.
 22 Mostly ov't.* (172)
 23 Mostly ov't and obs. nearly impos. to 10^h.* (173)
 24 Clear.* (174)
 25 Ov't. Obs. impos. to 9^{½h}, and doubtless all night.
 26 Mostly ov't. Obs. impos. to 10^{½h}, and doubtless all night.
 27 Clear. Moon interferes. No A.B. seen to 10^{½h}.
 28 Clear. Moon. No A.B. seen to 11^h.
 March 1 Clear. Moon. No A.B. to 10^h.
 2 Mostly ov't. Obs. impos. to 10^h, and prob. all night. [to 9^{¼h}.
 3 M'y ov't: moon: obs. n'y impos.: no A.B. seen in clear spaces in N.
 4 Clear. Moon. No A.B. to 10^{½h}.
 5 M'y ov't, and wh'y so after 8^h: no A.B. seen to 8^h, after obs. impos.
 6 Snowing and raining. Obs. impos. to 10^h, and doubtless all night.
 7 Ov't; snowing after 9^h: obs. impos. to 10^h, and d's most of night.
 8 Mostly ov't. Obs. impos. to 10^{½h}, and doubtless later.
 9 Ov't. Obs. impos. to 11^h, and doubtless all night.
 10 Ov't and snowing. Obs. impos. to 10^h, and doubtless all night.
 11 Clear. A slight auroral light in the N. seen up to 10^{½h}. (175)
 12 Ov't. Obs. impos. to 10^h, and d's all night. Snowing d'g night.
 13 Ov't. Obs. impos. to 10^h, and doubtless later.
 14 Ov't. Obs. impos. to 10^h, and probably later.
 15 Mostly ov't. Obs. nearly impos. to 10^h.*
 16 Ov't and snowing. Obs. impos. to 10^h, then partly breaking up.

Feb. 7th.—About 6h 50m, besides a large general illumination in N., there was a luminous spot about 5° high in E., and an irregular wide band of fluctuating vapory light from horizon about N. 60° W. nearly to zenith; no regular belt was formed, and this part soon faded. The A.B. continued in N. to 10h at least. I saw no streamers. Moon after 8h.

Feb. 8th.—About 8h 55m, only a small segment of about 15° long of this arch was visible, extending from N. to N. 10° W., it was constant for a few minutes. I saw no streamers to 10^{½h}.

Feb. 12th.—Occupied within most of evening; but other observers reported that there was no A.B. At 10h I was tolerably sure that there was a faint illumination in N. horizon.

Feb. 15th.—[A.B. seen at Worcester, Mass.—9th Report Lunatic Asylum.]

Feb. 18th.—Mr. Wm. Stow, city watchman, informs me that there was, between 2h and 4h A. M. of 18th, considerable auroral light in N.: he saw no streamers.

Feb. 22d.—A considerable A.B. visible between 7h and 8h, but soon after overcast. Very little streaming, but an irregular band of light 50° high in N.; bright spots in W.N.W. and E.

Feb. 23d.—Through fissures in the clouds there seemed some unusual light. I strongly suspect an A.B. [A.B. seen at Worcester, Mass.]

Feb. 24th.—At 10h there was a faint auroral light in N. I saw none between 9h and 10h. It was faint, but, I think, certain. Mr. F. Bradley saw short streamers at 11h.

March 15th.—No A.B. seen, and none but a brilliant one could have been seen. [Mr. C. S. Lyman suspected a faint auroral light. A.B. seen at Worcester, Mass., 14th and 15th insts.]

1841.

- Mar. 17 Partly clear but most of the time cloudy in north.*
 18 Ov't to 10^h at least.*
 19 Clear. A slight A.B. most of evening. (176)
 20 Clear, but hazy about horizon.*
 21 Clear. No A.B. to 10^h.* (177)
 22 Al't wh'y ov't to 9^h, aft. stars seen; hazy: no A.B. seen to 11^h.
 23 Cleared up about 10^h.* (178)
 24 Clear.* (179)
 25 M'y cl'r; low cl'd in N.: faint A.B. w'd not be vis.: no A.B. seen.
 26 Mostly cl'r: moon interf.: no A.B. seen to 10^h, but obs. not certain.
 27 Ov't. Obs. impos. to 10^h, and doubtless all night.
 28 Ov't. Obs. impos. to 10^h, and doubtless all night.
 29 Ov't, slight rain. Obs. impos. to 10^h, and doubtless all night.
 30 Mostly clear in N. Moon interferes. No A.B. seen to 10^h.
 31 Almost entirely ov't. Obs. impos. to 10^h, and prob. all night.
- April 1 Clear. Moon interferes. No A.B. to 10^h.
 2 Ov't and rainy. Thunder storm in evening. Obs. impos. to 11^h.
 3 Mostly clear. Moon. No A.B. to 10¹/₄^h.
 4 Ov't and stormy. Obs. impos. to 10¹/₂^h.
 5 Ov't and rainy in part. Obs. impos. to 9¹/₂^h, and prob. all night.
 6 Clear. Moon. No A.B.
 7 Ov't, misty and rainy. Obs. impos. to 10^h, and d's all night.
 8 Mostly clear. No A.B. to 10^h.
 9 Ov't, some rain. Obs. impos. to 10^h, and probably all night.
 10 Ov't. Obs. impos. to 10^h, and probably much later.
 11 Mostly clear to 9^h, after that mostly cloudy in N.* (180)
 12 Violent northeasterly snow storm. Obs. impos. all night.
 13 Clear. No A.B. to 10¹/₂^h.
 14 Clear, but a long cloud low in N. No A.B. to 10^h.
 15 Clear. No A.B. to 10^h.
 16 Clear. A faint auroral light in N. between 8^h and 9^h.* (181)
 17 Ov't. Obs. impos. to 10^h, and doubtless all night.
 18 Partly clear. A.B. Considerable general illumination.* (182)
 19 Clear. A.B. seen to 1^h A. M. of 20th.* (183)
 20 Ov't, raining after 8¹/₂^h, probably all night. Obs. impos.
 21 Ov't. Obs. impos. to 10^h, and doubtless all night.
 22 Ov't, raining most of the time: obs. impos. to 10^h, and d's all night.
 23 Ov't; drizzling rain. Obs. impos. to 10^h, and undoubtedly all n't.
 24 Ov't, except about 8^h. Obs. impos. to 10^h, and d's all night.*
 25 Ov't. Obs. impos. to 10^h, and probably all night.
 26 Almost wholly ov't. Obs. impos. to 10^h, and probably all night.

March 17th.—No A.B. certainly seen, but at intervals there seemed to be some illumination, probably the contrast of sky and clouds.

March 18th.—Behind the clouds there appeared to be some unusual light in N., but it may have been due to thinness of clouds in that quarter.

March 20th.—Mr. A. B. Haile thinks there was a faint auroral light about 11h; this is rather doubtful.

March 21st.—About 10h 45m there was a faint auroral light in N. [Prof. E. A. Andrews informs me that a traveller told him that during the night (coming from Worcester) he saw the A.B. very splendid.]

March 23d.—A bright auroral light round N. horizon about 3° high, with some streamers.

March 24th.—An auroral arch low in N. horizon all the evening, about 2° high; bright. I saw no streamers.

April 11th.—A faint auroral light in N. I saw no streamers, but could not observe long.

April 16th.—Scarcely discernible after 9h, the sky becoming then slightly hazy.

April 18th.—I saw no definite streamers, but I did not watch long. Seen all the evening.

April 19th.—General light and occasional streamers 10° or 15° high.

April 24th.—A burning shop mistaken for an A. B. at Hartford.

1841.

- Apr. 27 Clear. Moon. No A.B. seen to 10^h.
 28 Clear: moon: no A.B. seen to 10¹/₂^h, but I was within most of ev'g.
 29 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 30 Mostly ov't. Obs. impos. to 10^h, and probably all night.
- May 1 Ov't. Obs. impos. to 10^h, and doubtless later.
 2 Mostly clear. Moon. No A.B. to 10^h.
 3 Clear. Moon. No A.B. to 9^h.
 4 Mostly clear. Moon. No A.B. seen to 9^h.
 5 Ov't and rainy. Obs. impos. to 10¹/₂^h, and doubtless all night.
 6 Mostly clear. Moon. No A.B. to 9^h.
 7 Ov't and rainy in part. Obs. impos. to 9^h, and doubtless all night.
 8 Clear. A faint A.B. lying low in N.: seen to 10^h. (184)
 9 Almost wholly ov't. Obs. impos. to 9¹/₂^h, and doubtless all night.
 10 Ov't and misty. Obs. impos. to 9¹/₄^h, and doubtless all night.
 11 Beautifully clear. No A.B. to 9¹/₂^h.
 12 Almost entirely ov't. Obs. nearly impos. to 10¹/₄^h. None seen.
 13 Clear and fine. No A.B. to 10^h.
 14 Mostly ov't. Obs. nearly impos. to 9¹/₂^h. None seen.
 15 Mostly ov't. Obs. impos. to 9¹/₂^h.
 16 Clear, but somewhat hazy about horizon. No A.B. to 9¹/₂^h.
 17 Clear. No A.B. to 10¹/₄^h.
 18 Clear. No A.B. to 9¹/₂^h.
 19 Ov't to 9^h; clear between 9^h and 10^h. No A.B. then.
 20 Clear. No A.B. to 9¹/₄^h.
 21 Cloudless, but very hazy towards horizon. No A.B. seen to 9¹/₂^h.
 22 Ov't: obs. impos. to 9¹/₂^h, and p. all n't: thunder shower about 1^h.
 23 Clear. Moon begins to interfere. No A.B. seen to 10^h.
 24 Clear. Moon. No A.B. seen to 10^h.
 25 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 26 Ov't. Obs. impos. to 10^h, and doubtless most of the night.
 27 Ov't. Obs. impos. to 11^h, and doubtless all night.
 28 Clear to 10^h, when fleecy clouds came over: moon: no A.B. to 10^h.
 29 Rain most of ev'g; p'y cl'r aft. 9^h: obs. impos. to 10^h, p. most of n't.
 30 Beautifully clear. Moon interferes. No A.B. seen to 10¹/₄^h.
 31 Beautifully clear. Moon interferes. No A.B. seen to 10¹/₂^h.
- June 1 Ov't. Obs. impos. to 10^h, and probably all night.
 2 Clear after 9^h. No A.B. to 10¹/₄^h. Moon interferes.
 3 Mostly clear. Moon. No A.B. seen to 10¹/₄^h.
 4 Mostly clear. Moon. No A.B. to 10^h.
 5 Hazy, with some cirri: moon: no A.B. seen to 10¹/₂^h, but obs. unc.
 6 Clear. No A.B. to 10¹/₂^h.
 7 Mostly ov't; a little rain about 8^h. Obs. impos. to 10^h.
 8 Mostly clear. No A.B. to 10^h.
 9 Mostly clear. No A.B. to 10¹/₄^h.
 10 Clear; few clouds in N.W. No A.B. to 10^h.
 11 Mostly ov't. Obs. impos. to 10^h, and doubtless much later.
 12 Much ov't, especially in N. Obs. impos. to 10^h.
 13 Ov't to 10^h, and probably all night. Obs. impos.
 14 Ov't and raining part of night: obs. impos. to 10¹/₂^h, and p. all n't.
 15 Beautifully clear.* (185)
 16 Beautifully clear. No A.B. to 11^h.

June 15th.—About 10^h observing carefully for zodiacal light, which is, I think, still visible chiefly between N. and W. At this period I feel quite sure that there is a faint auroral bank, low in the northern horizon. I saw no streamers.

1841.

- June 17 Mostly ov't.* (186)
- 18 Ov't. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night.
- 19 Ov't. Obs. impos. to $10\frac{1}{2}^h$, and doubtless later.
- 20 Partly clear to $9\frac{1}{2}^h$; after that to 10^h ov't and obs. impos.
- 21 Clear. No A.B. to 11^h . [A.B. seen at Worcester, Mass.]
- 22 Ov't. Obs. impos. to 10^h .
- 23 Ov't. Obs. impos. to 10^h , and probably all night.
- 24 Ov't. Obs. impos. to $10\frac{1}{2}^h$, and probably all night.
- 25 Ov't; drizzling mist. Obs. impos. to 10^h , and doubtless all night.
- 26 Mostly ov't. Obs. impos. to 10^h , and probably most of the night.
- 27 Ov't. Obs. impos. to 10^h , and doubtless later.
- 28 Clear. Moon interferes. No A.B. seen to $10\frac{1}{2}^h$.
- 29 Clear. Moon. No A.B. to 10^h .
- 30 Mostly clear but hazy: moon: no A.B. to $10\frac{1}{2}^h$, but obs. uncertain.
- July 1 Sky obscured here and there by cirri. Moon. No A.B. to $10\frac{1}{4}^h$.
- 2 Clear in north; some clouds elsewhere. Moon. No A.B. to 10^h .
- 3 Clear. Moon. No A.B. to 10^h .
- 4 Mostly clear. Moon. No A.B. to 10^h .
- 5 Ov't: frequent lightning. Obs. impos. to 10^h , and doubtless later.
- 6 Ov't. Obs. impos. to 10^h , and doubtless all night.
- 7 Ov't, with slight rain. Obs. impos. to 10^h , and doubtless all night.
- 8 Beautifully clear. No A.B. to 10^h , when the moon rose.*
- 9 Mostly ov't. Obs. impos. after—to 10^h , and doubtless later.
- 10 Very clear. No A.B. to 10^h .*
- 11 Mostly clear. No A.B. to 10^h .
- 12 Clear. No A.B. to $10\frac{1}{2}^h$.
- 13 Clear to about 10^h , when it suddenly became ov't: no A.B. to $9^h 50^m$.
- 14 Ov't to 10^h , and prob. most of night. Thunder shower about 9^h .
- 15 Clear, except a long cloud in N. No A.B. seen to $10\frac{1}{4}^h$.
- 16 Clear. No A.B. to $10\frac{1}{4}^h$.*
- 17 Clear. No A.B. to $10^h 20^m$.
- 18 Clear. No A.B. to $10\frac{1}{4}^h$.
- 19 Considerably clouded in north.* (187)
- 20 Clear. No A.B. to $10\frac{1}{4}^h$.
- 21 Clear.* (188)
- 22 Mostly clear, but hazy around horizon. No A.B. seen to $10\frac{1}{4}^h$.
- 23 M'y ov't; showery to 11^h , when n'y cl'r in N., and there was no A.B.
- 24 Ov't. Obs. impos. to 10^h , and probably all night.
- 25 Ov't. Obs. impos. to 10^h , and doubtless to midnight.
- 26 Clear. Moon. No A.B. to $10\frac{1}{2}^h$.
- 27 Mostly ov't. Obs. impos. to 10^h , and probably all night.

June 17th.—Among the broken clouds in the N. there was much unusual light about $10^h 30^m$ (for it was too much overcast earlier); a considerable A.B. without much doubt. [A.B. seen at Worcester, Mass.]

July 8th.—At $9^h 45^m$ went out with Mr. A. B. Haile and Mr. J. T. Hotchkiss to look for the zodiacal light. We decide that there is a faint light or milkiness, extending from about Cassiopeia to Leo, through the N.W., about 10° or 12° high. It has no definite outline but is certainly real. Near Cassiopeia it is of course confounded with the Galaxy.

July 10th.—From $9^h 40^m$ to $9^h 50^m$ Mr. A. B. Haile and myself observed for the zodiacal light. It corresponds with what we saw Thursday the 8th. It is about Leo very faint, and must be inspected by indirect glances. It reaches perhaps to Denebola.

July 16th.—Faint light, which I suppose the "zodiacal," still to be seen about $9^h 45^m$ to 10^h , from N. to N.W., as described a few days since.

July 19th.—A conspicuous A.B. visible from 9^h to 10^h , and doubtless later, illuminating N. horizon about 90° , and to a central altitude of 15° ; much general light and occasional streamers, some of them bright. Color yellowish-white. Clouds interfere with observation.

July 21st.—A faint auroral illumination at 10^h , and also at 2^h of 22d; a dusky light, like fog slightly illuminated. I saw no streamers.

1841.

- July 28 Cl'r: moon: no A.B. seen to 10^h. [A.B. seen at Worcester, Mass.
 29 Cirrous clouds in N.: moon: obs. n'y impos.: no A.B. seen to 10^h.
 30 Clear. Moon. No A.B. seen to 10^h.
 31 Ov't and rainy. Obs. impos to 10^h, and doubtless much later.
- Aug. 1 Clear. Moon. No A.B. to 9^h $\frac{1}{2}$.
 2 Cl'r: moon full: a distinct A.B. at 9^h 40^m for a few minutes.* (189)
 3 Clear: moon: no A.B. seen to 10^h $\frac{1}{4}$; but I was within until 9^h 40^m.
 4 Mostly ov't. Obs. impos. to 10^h $\frac{1}{4}$, and probably all night.
 5 Ov't. Obs. impos. to 10^h.
 6 Much ov't at times: but at 9^h the N.E. and E. were clear.* (190)
 7 Clear, but hazy about horizon. No A.B. seen to 10^h.
 8 Al't wholly ov't and wholly so after 9^h, prob. all n't. Obs. impos.
 9 Ov't to 10^h $\frac{1}{4}$ at least. Obs. impos.
 10 Ov't and rainy after 10^h. Obs. impos. to 11^h, and d's all night.
 11 Ov't to 10^h: p'y cl'r (at 10^h $\frac{1}{2}$) in N.W.: obs. imp. to 11^h, and p. all n't.
 12 Ov't to 10^h, then p'y cl'r in S.W. for a while. Obs. impos. to 10^h $\frac{1}{2}$.
 13 Al't wholly ov't to 10^h $\frac{3}{4}$, and doubtless all night. Obs. impos.
 14 Clear. A faint A.B. all the evening to 11^h.* (191)
 15 Clear. No A.B. to 10^h $\frac{1}{4}$.
 16 Clear. No A.B. to 9^h, and none as I can learn to 10^h.
 17 Clear, but hazy. No A.B. to 10^h $\frac{1}{4}$.
 18 Mostly cl'r to 9^h $\frac{1}{4}$. No A.B. to that time: soon after wh'y ov't to 10^h $\frac{1}{2}$.
 19 Cloudless, but hazy. No. A.B. to 10^h 5^m.
 20 Clear. No A.B. to 10^h.
 21 Ov't. Obs. impos. to 10^h, and probably most of night.
 22 Ov't almost wholly. Obs. impos. to 10^h, and doubtless later.
 23 Much clouded in N. Obs. nearly impos. to 10^h.* (192)
 24 Clear. Moon interferes. No A.B. to 10^h and none at 3^h $\frac{1}{2}$ A.M. of 25th.
 25 Clear. Moon. No A.B. to 10^h $\frac{1}{2}$.
 26 Ov't, raining slightly. Obs. impos. to 10^h, and doubtless all night.
 27 Ov't; drizzle. Obs. impos. to 10^h, and doubtless all night.
 28 Ov't to 10^h, and doubtless all night. Obs. impos.
 29 Ov't to 10^h, and doubtless all night. Obs. impos.
 30 Mostly ov't. Obs. impos. to 10^h, and probably all night. Moon.
 31 Ov't. Obs. impos. to 10^h, and doubtless later.
- Sept. 1 Clear. Moon interferes. No A.B. seen to 10^h. [impos. to 10^h.
 2 Much obsc. by cirri and after 9^h $\frac{1}{2}$ by thick cl'ds. Obs. n'y or quite
 3 Mostly clear to 9^h $\frac{1}{2}$, afterwards cloudy. Moon. No A.B. seen.
 4 Clear after 9^h. Moon. No A.B. to 10^h.
 5 Clear. Moon. No A.B. to 9^h $\frac{1}{2}$.
 6 M'y cl'r to 9^h: at 10^h to midnight wholly ov't. No A.B. seen to 9^h.
 7 Very clear most of evening. No A.B. to 10^h.*
 8 Very clear. No A.B. to 10^h.
 9 Clear. No A.B.

Aug. 2d.—Groups of short streamers rising from a dark segment, some quite vivid and quick-moving laterally. None reached higher than 20°. Watched about 15 minutes; but it soon faded. Moon greatly interferes. Streamers 30° each side of N.

Aug. 6th.—There was much diffuse light in N., but obstructed by clouds, and about 9h an auroral band, rising in E. and extending about 40° high at vertex, towards the west: was not sharply defined: moved upward, but disappeared before it reached zenith. Clouds greatly interfere.

Aug. 14th.—At times a tolerably distinct arch 5° to 8° high at vertex, and occasionally a few faint streamers.

Aug. 23d.—About 10h 20m there was a decided auroral light low in N., but partially obscured by clouds.

Sept. 7th.—At 9h went to Observatory to see if zodiacal light could be discovered. I am doubtful whether any traces can be seen; there seems to be a very faint light lying a few degrees above horizon from N. to W.N.W. Nothing visible in the ecliptic, which now cuts the horizon at a very small angle here.

1841.

- Sept. 10 Ov't and drizzling. Obs. impos. to 10^h.
 11 Clear to 9^h. No A.B. seen to that time: after that ov't.
 12 Almost wholly ov't to 10^h, and probably all night.* (193)
 13 Ov't to 10^h: obs. nearly or quite impos.: slight A.B. susp.* (194)
 14 Clear. No A.B. to 10^h.* (195)
 15 Clear, but somewhat hazy. No A.B. to 10^h.
 16 Cl'ss, but somewhat hazy to 9½^h. No A.B. At 10^h al't wh'y ov't.
 17 Ov't and rainy to 10^h at least. Obs. impos.
 18 Clear. No A.B. to 10^h.* (196)
 19 Clear to 8^h: after that ov't and obs. impos. to 10^h, and p. all night.
 20 Clear, but hazy about horizon. No A.B. to 10^h 10^m.
 21 Ov't. Obs. impos. to 10½^h, and probably later.
 22 M'y cl'r: moon: no A.B. cert. seen to 10^h, but pos. there is a faint l't.
 23 Ov't. Raining occasionally during ev'g and night. Obs. impos.
 24 Ov't and rainy: obs. impos. to 11^h, and d's all night: ov't at 4^h A.M.
 25 Very clear. A conspicuous A.B. Moon interferes.* (197)
 26 Clear. A slight A.B. about 7^h to 7¼^h.* (198)
 27 Clear. Moon. No A.B. seen to 9^h 35^m.
 28 Much cl'ded: moon: obs. n'y impos. to 10½^h, p. all n't: no A.B. seen.
 29 Ov't, copious rain. Obs. impos. to 10^h, and doubtless all night.
 30 Clear. Moon. No A.B. seen to 10^h. [evening.]
 Oct. 1 M'y cl'r: moon interf.: no A.B. seen to 9½^h: within doors most of
 2 Ov't wholly. Obs. impos. to 10^h, and doubtless all night.
 3 Ov't; rain and snow.
 4 Wholly ov't. Obs. impos. to 10½^h, and doubtless all night.
 5 Wholly ov't. Obs. impos. to 10^h, and doubtless all night.
 6 Clear. No A.B. seen to 10^h, but I did not watch closely; p. none.*
 7 Al't wh'y ov't; raining from 9^h to 10^h: obs. impos. to 10^h, d's all n't.
 8 Mostly ov't; entirely so in N.: obs. impos. to 10^h, and d's later.
 9 Clear. A.B. seen all the evening. Not very brilliant.* (199)
 10 Clear. No A.B. to 9½^h.
 11 Wh'y ov't: obs. impos. to 10^h, and d's all night. Rain d'g night.
 12 Almost wholly ov't. Obs. impos. to 10^h, and prob. much later.
 13 Clear. No A.B. to 10^h.
 14 Mostly clear.* (200)
 15 Mostly clear. No A.B. seen to 9½^h: did not watch closely.
 16 Ov't. Obs. impos. to 10^h.
 17 Clear: within most of ev'g: no A.B. from 9½^h to 10^h: p. none in ev'g.
 18 Clear: within most of evening: no A.B. at 10¾^h: p. none in ev'g.

Sept. 12th.—A.B. at Montreal, Canada, according to Prof. Olmsted, who was there. A.B. seen in Michigan; J. N. Nicollet, *Trans. Am. Phil. Soc.*, N. S. 8: 323.

Sept. 13th.—A.B. seen in Michigan: J. N. Nicollet, *Trans. Am. Phil. Soc.*, N. S. 8: 323.

Sept. 14th.—At 10^h 15^m I suspected a very faint light of A.B. on northern horizon.

Sept. 18th.—Mr. F. Bradley informs me that he saw a slight A.B. at 11^h, a few streamers 10° or 15° high.

Sept. 25th.—A brilliant arch from W.N.W. to E.N.E. rising at 8^h (the highest) about 40°; then broke up and lower arches succeeded. Between 9^h and 10^h, brilliant streamers and spots; none seen higher than 45°.

Sept. 26th.—A single wisp of auroral light in N.W. just under the handle of the dipper (in Ursa Major), drifted slowly westward and downward, and disappeared at 7^h 15^m. Scarcely any other auroral indications. Moon brilliant. (Short notice of A.B. of 25th and 26th published in *N. H. Daily Herald* and *N. H. Daily Palladium* of Sept. 29th.)

Oct. 6th.—Immediately after close of twilight I searched for zodiacal light; sky very clear. On critical examination and comparison it appears to me that there is a very faint illumination extending from about Arcturus in N.W. to Galaxy in S.S.W., and reaching upwards to a line connecting ε, α, and δ Serpentis. No A.B. at the time. Moon and Venus interfere in the morning.

Oct. 9th.—An arch at times 2° or 3° high and occasional streamers 10° or 12° high.

Oct. 14th.—A slight A.B. at times, somewhat obscured by clouds in N. [A.B. seen at Worcester, Mass.]

1841.

- Oct. 19 Ov't in N.; p'y cl'r elsewhere: obs. n'y impos. to 10^h, and p. later.
 20 Mostly ov't. Moon interferes also.* (201)
 21 Much cl'ded about N.: moon: obs. very unc.: no A.B. seen to 10^h.
 22 Ov't. Obs. impos. to 10^h, and probably all night.
 23 Clear early in evening. No A.B. at 7½^h. After 9^h ov't.
 24 Clear. Moon. No A.B. seen to 10^h.
 25 Clear: moon: no A.B. seen to 10½^h: within most of ev'g.* (202)
 26 Cloudless, hazy: moon: no A.B. seen to 10^h: within from 7^h to 10^h.
 27 Clear: moon: no A.B. seen to 10¼^h: within most of evening.
 28 Cloudless, but hazy. Moon. No A.B. seen to 8^h.
 29 Clear until 7½^h to 8^h; after that foggy. Moon. No A.B. seen.
 30 Clear, some haze: moon: no A.B. seen to 10^h: within most of ev'g.
 31 Foggy. Obs. impos. to 11^h, and probably all night.
- Nov. 1 Mostly clear. Moon. No A.B. seen to 10^h. Within most of ev'g.
 2 Very clear. No A.B. seen to 10^h. Within most of evening.
 3 Cl'r at 7^h: no A.B. seen early in ev'g: ov't at 9^h and aft.: obs. imp.
 4 Ov't; raining between 9^h and 10^h: obs. impos. to 10^h, and p. all n't.
 5 Very clear most of evening. Some clouds in N. at 10^h.* (203)
 6 Clear. No A.B. to 11^h.
 7 Clear. No A.B. to 10^h.
 8 M'y cl'r: no A.B. to 10^h; pos. a faint auroral l't about 7^h: doubtful.
 9 Clear. No A.B. to 10^h.
 10 Clear. No A.B. to 10^h.
 11 Clear. No A.B. to 11^h. Rainy at 6^h A. M. of 12th.
 12 Clear. No A.B. to 10^h. None from 4^h to 6^h A. M. of 13th.
 13 Ov't to 10^h, then clear, and no A.B. visible. None at 4^h of 14th.
 14 Ov't and rainy: obs. impos. to 10^h: none from 4^h to 6^h of 15th: cl'r.
 15 Cloudy in N. during first part of evening.* (204)
 16 Clear. No A.B. to 10^h.
 17 Mostly clear, but some clouds low in N. No A.B. to 10^h.
 18 Clear. Moon begins to interfere.* (205)
 19 Ov't and raining to 10^h, and doubtless all night. Obs. impos.
 20 Ov't. Obs. impos. to 10^h, and probably all night.
 21 M'y cl'r to 9^h, when it became partially ov't: moon: no A.B. to 10^h.
 22 Ov't and raining. Obs. impos. to 10^h, and doubtless later.
 23 Mostly clear. Moon. No A.B. to 10^h. Within from 7^h to 9½^h.
 24 Considerably ov't. Moon. Obs. nearly impos. to 10^h.
 25 Ov't. Obs. impos. to 10^h, and doubtless all night.
 26 Ov't. Obs. impos. to 10^h, and doubtless later.
 27 Clear. Moon. No A.B. to 10^h.
 28 Ov't. Obs. impos. to 10^h, and doubtless all night.
 29 Ov't. Obs. impos. to 9^h, when clearing. Moon. No A.B. to 10^h.
 30 Mostly clear. Moon interferes. No A.B. seen to 10^h.

Oct. 20th.—Observation nearly or quite impossible up to 10^h. Mr. Jobamah Gunn, of the city watch, informs me that about 1^h A. M. (21st) there was a brilliant auroral display, not extending higher than 40°; streamers, rapidly shifting, &c.

Oct. 25th.—Mr. Azariah Smith informs me that at 5 A. M. this morning there was some auroral light in N. He saw no streamers.

Nov. 5th.—There seemed then to be considerable unusual light in N., but the rising of the moon and the position of the clouds made it uncertain. Probably an A.B. Searched for the zodiacal light in S.W.; doubtful whether any trace of it can now be detected.

Nov. 15th.—A slight A.B. about 10^h; a single definite streamer seen by Mr. F. Bradley.

Nov. 18th.—A beautiful display of the Aurora Borealis, beginning as early as 5^h 45^m, and continuing probably all night. Before 6^h the display consisted chiefly of auroral banks and wisps, quite irregular; but after, and especially between 10^h and 11^h, there was a grand and most animated display of merry dancers, passing and repassing, vanishing and flashing up, in a remarkable manner. Streamers occasionally reached the zenith; and about 11^h an indistinct corona was formed for a few minutes. (See Prof. Olmsted's account in *N. H. Daily Herald* of 19th November, also Dr. J. G. Percival's.)

1841.

- Dec. 1 Cloudless, but hazy to 8^h, after that ov't. No A.B. early in ev'g.
 2 P'y cl'r at 6^h; ov't at 8^h: obs. impos. to 10^h: no A.B. early in ev'g.
 3 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 4 Partly clear to 8^h. No A.B. Very clear at 6^h.
 5 Partly clear. No A.B. at 9^h; mostly clouded in N. before.
 6 Chiefly clear. No A.B. to 10^h.
 7 Clear. No A.B. to 10^h.
 8 Clear at 6^h; after ov't and obs. impos. most of night: no A.B. at 6^h.
 9 Ov't. Obs. impos. to 10^h, and probably all night.
 10 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 11 Ov't; raining at 10^h. Obs. impos. to 10^h, and doubtless much later.
 12 Clear. No A.B.
 13 Ov't. Obs. impos. to 10^h, and doubtless all night.
 14 Clear. A.B., beginning at dusk, 5^h 25^m.* (206)
 15 Ov't. Obs. impos. to 11^h, and probably all night.* (207)
 16 Ov't and raining. High wind with rain all night.
 17 Ov't. Obs. impos. to 10½^h, and doubtless all night.
 18 Ov't until about 10^h, when it was clear in N. No A.B. then.
 19 Much clouded, but oc'y clear in N. No A.B. seen to 9½^h. Moon.
 20 Ov't; snowing from 8^h and after: obs. impos. to 10½^h, and d's all n't.
 21 Clear. Moon. No A.B. to 10^h.
 22 Clear: moon: no A.B. seen to 10½^h: within doors most of the time.
 23 Ov't and raining all night. [appearance.
 24 M'y cl'r: moon: prob. no A.B., but at times I susp. a faint auroral
 25 Mostly clear. Moon. No A.B. seen to 10^h. Within most of ev'g.
 26 Clear. Moon. No A.B. to 9½^h. Within most of evening.
 27 Ov't. Obs. impos. to 10^h, and probably all night.
 28 Mostly clear. Moon. No A.B. seen to 10^h. Within most of ev'g.
 29 Hazy, and p'y cl'y. Moon. No A.B. seen to 10^h. [break away.
 30 Ov't, snowing and raining: obs. impos. to 10^h, when cl'ds began to
 31 Clear until about 8^h, after that ov't. No A.B. seen to 8^h.

1842.

- Jan. 1 Clear. No A.B. to 10^h. Within most of ev'g. [been visible.
 2 Clouds in N.: no A.B. seen to 9½^h: a mod. display might not have
 3 Clear and cloudy by turns, mostly cloudy. No A.B. seen to 10^h.
 4 Mostly ov't, but chiefly clear a short time at 10^h. No A.B. then.
 5 Beautifully clear and cold. No A.B. to 10^h.
 6 Snowing and raining after 7^h. Obs. impos. to 11^h, and d's all night.
 7 Ov't. Obs. impos. to 10^h.
 8 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.*
 9 Ov't, but clouds oc'y broken in N.: some unusual light susp.
 10 Ov't till about 9^h, when tolerably clear. No A.B. then visible.
 11 Ov't most of evening, but clear at 11^h, when there was no A.B.
 12 Ov't. Obs. impos. to 10^h. Clear toward morning at least.
 13 Very clear. No A.B. to 10^h.
 14 Ov't until about 9^h, after mostly clear. No A.B. to 10^h.
 15 Mostly clear, but some clouds in N.* (208)
 16 Ov't; clear at 8^h and after. No A.B. to 10^h.

Dec. 14th.—Not much action after 6h 30m. I saw no streamers, but only large brilliant spots here and there, from E. to W., and some 15° high.

Dec. 15th.—Some light in N., but may be due to thinness of clouds in that quarter. Mr. F. Bradley saw at 8h what he thought the A.B., but rather an anomalous display.

Jan. 8th.—A.B. seen at 11h at St. Louis, Mo., as per Meteor. Jour. of Dr. B. B. Brown (*St. Louis Daily Evening Gazette*, Feb. 10, 1842). Probably a moderate display.

Jan. 15th.—A considerable A.B.; general light for 90° of horizon, extending 5° high. I saw no streamers, but I watched only a few minutes.

1842.

- Jan. 17 Mostly clear. No A.B. to 10^h.
 18 Clear. Moon until 10^h. No A.B. to 11^h.
 19 Clear. Moon. No A.B. to 11^h.
 20 Mostly clear to 9^h, after that too cloudy for obs. Moon.*
 21 Clear in N. during latter part of evening. Moon. No A.B. to 10^h.
 22 Clear: moon: no A.B. to 10¹/₂^h: within doors most of the evening.
 23 Clear. Moon. No A.B. to 9^h.
 24 Clear except a few low clouds in N. Moon. No A.B. to 10^h.
 25 Clear after 7^h. Moon. No A.B. to 10^h.
 26 Mostly clear. Moon. No A.B. to 10^h.
 27 Clear. Moon. No A.B. seen to 11¹/₂^h.
 28 Very clear. No A.B.
 29 Clear at 6¹/₂^h: no A.B. then: aft. a heavy fog, and obs. impos. to 10¹/₂^h.
 30 Clear. No A.B. to 9^h.
 31 Ov't. Obs. impos. to 11^h at least.
- Feb. 1 Clear. No A.B. to 10^h.
 2 Clear but somewhat hazy. No A.B. to 10¹/₂^h.
 3 Ov't. Obs. impos. to 11^h, and doubtless all night.
 4 Ov't. Obs. impos. to 11^h, and doubtless all night.
 5 Clear. No A.B. to 10^h.
 6 Clear. No A.B. to 9¹/₂^h, when it became partly clouded.* (209)
 7 Ov't. Obs. impos. to 10^h, and probably all night.
 8 Squalls of snow during evening. Clear after 8^h. No A.B. to 10^h.
 9 Clear after 7¹/₂^h. No A.B. to 10¹/₂^h.
 10 Clear. No A.B. to 10^h.
 11 Chiefly clear to 9^h; after that ov't.* (210)
 12 Mostly clear. No A.B. to 10^h.
 13 Ov't. Obs. impos. to 9¹/₂^h, and doubtless much later.
 14 Clear, except a bank of cloud 10° high in N. No A.B. to 10^h.
 15 M'y cl'r until 9^h, when it became hazy and then cl'y: no A.B. seen.
 16 Ov't and raining. Obs. impos.
 17 Clear. Moon interferes. No A.B. seen to 10^h.*
 18 Ov't. Obs. impos. to 10^h, and doubtless all night.
 19 Clear. Moon. No A.B. seen to 10^h.
 20 Ov't. Obs. impos. to 10^h.
 21 Clear. Moon. No A.B. seen to 10¹/₂^h.
 22 Clear. Moon. No A.B. seen to 10^h. Within most of the evening.
 23 Clear. Moon. No A.B. seen to 9^h. Some cloudiness in N.
 24 Mostly ov't. Obs. nearly impos. to 10^h. Moon. No A.B. seen.
 25 Hazy and partly cl'y to 9^h, aft. ov't: moon: obs. dif.: no A.B. seen.
 26 Ov't and raining. Obs. impos. to 10^h, and prob. all night.
 27 Partly clear to 8^h. No A.B. to 8^h; after that too cloudy for obs.
 28 Mostly clear. No A.B. to 10^h.
- Mar. 1 Ov't. Obs. impos. to 10^h, and probably all night.
 2 Ov't and drizzling. Obs. impos. to 10^h.
 3 Clear. No A.B. to 10^h.
 4 Cloudless, but hazy. No A.B. to 10¹/₂^h.
 5 Ov't. Obs. impos. to 10^h, and probably all night.
 6 Ov't. Obs. impos. to 10^h. Lightning in evening.

Jan. 20th.—At times I suspected a faint light in N., but could not determine.

Feb. 6th.—About 10^h through the clouds there appeared some indications of the A.B. I am disposed to think them real.

Feb. 11th.—About 9^h there is a slight aurora; a luminous bank low in the N.

Feb. 17th.—About 9^h 30m, a faint light is suspected in N., but very uncertain.

1842.

- March 7 Ov't chiefly in evening; clearing about 9^h.*
- 8 Very clear. No A.B. to 10^h.
- 9 Ov't. Obs. impos. to 10^h, and probably all night.
- 10 Hazy and partly ov't. Obs. embarrassed. No A.B. seen to 11^h.
- 11 Clear and cold. No A.B. to 10^h.
- 12 Clear. No A.B. to 10^h.
- 13 Clear. No A.B. to 9^h.
- 14 Clear. No A.B. to 10^h.
- 15 Ov't. Obs. nearly or quite impos to 10¹/₂^h.
- 16 Hazy. Obs. difficult. No A.B. seen to 10^h.
- 17 Cloudless, but hazy. No A.B. seen to 10^h. Moon interferes.
- 18 Mostly ov't. Moon. Obs. nearly or quite impos. to 9^h.
- 19 Hazy and partly ov't: moon: obs. n'y impos.: no A.B. seen to 10^h.
- 20 Ov't. Obs. impos. to 10^h.
- 21 Ov't. Obs. impos. to 10^h, and doubtless all night.
- 22 Ov't. Obs. impos. to 11^h.
- 23 Clear: moon: no A.B. seen to 10¹/₂^h: within most of evening.
- 24 Ov't. Obs. impos. to 10^h.
- 25 Ov't and raining part of the time: obs. impos. to 10¹/₂^h, and p. all n't.
- 26 Ov't most of evening. Moon. No A.B. seen during clear intervals.
- 27 Mostly ov't. Obs. nearly impos. No A.B. seen.
- 28 Clear. No A.B. to 8^h.
- 29 Ov't and raining after 8¹/₂^h. Obs. impos. to 10^h, and prob. all night.
- 30 Mostly ov't, but clear by 10^h and after. No A.B. then.
- 31 Clear. No A.B. to 10^h.
- April 1 Cloudless, but hazy. No A.B. seen to 10^h.
- 2 Very hazy, and by 9^h entirely ov't in N. Obs. impos. to 10^h.
- 3 Ov't, raining part of evening. Obs. impos. to 10^h, and d's all n't.
- 4 Ov't. Obs. impos. to 10^h. [A.B. then visible.
- 5 Ov't: obs. impos. to 11^h, when it began to break away in N.: no
- 6 Ov't. Obs. impos. to 10^h, and doubtless all night.
- 7 Ov't. Obs. impos. to 10^h, and doubtless all night.
- 8 Ov't. Obs. impos. to 10^h, and doubtless all night.
- 9 Ov't. Obs. impos. to 10^h.
- 10 Clear. A slight auroral light in the N. during the evening.* (211)
- 11 Clear.* (212)
- 12 Ov't. Obs. impos. to 10^h, and probably all night.
- 13 Ov't, and raining moderately. Obs. impos. to 10^h, and d's all n't.
- 14 Quite cloudy in N., but considerable A.B. visible.* (213)
- 15 Ov't most of ev'g; raining part of time to 10¹/₄^h: obs. impos.: cl'r in
- 16 Mostly clear, but hazy: moon interf.: no A.B. seen to 10¹/₂^h. [morn.
- 17 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
- 18 Ov't and raining. Obs. impos. to 11^h, and doubtless all night.
- 19 Ov't and raining. Obs. impos. all night.
- 20 Mostly clear. Moon.* (214)
- 21 Mostly clear, but somewhat hazy. Moon. No A.B. seen to 10^h.
- 22 Considerably ov't in the evening. Moon. No A.B. seen to 10^h.

March 7th.—Possibly some auroral light at that time, but uncertain. Overcast from 12h to 2h A. M.

April 10th.—I watched it but little.

April 11th.—A moderate A.B. for 20° each side of N. and extending 2° to 5° high. Occasional indefinite streamers from a low auroral bank.

April 14th.—At 10h 30m illumination reached altitude of 20° and horizontal extent of 90° or 100°. Between 1h and 3h A. M., 15th, a display of waves, passing up half-way to zenith, as I am informed.

April 20th.—Slight A.B. about 11h, and faint traces through the night.

1842.

- Apr. 23 M'y clear: moon: no A.B. seen to 10^h: within doors most of ev'g.
 24 Hazy. Moon. No A.B. seen to 10^h.
 25 Ov't and misty. Obs. impos. to 10^h.
 26 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 27 Very cl'r: no A.B. to 10^h: zod. light still bright and conspic. at 8½^h.
 28 Ov't. No obs. possible to 10^h at least.
 29 Very clear. No A.B. to 10^h.
 30 Very clear. No A.B. to 10^h.
- May 1 Clear most of evening. No A.B. to 10^h.
 2 Clear after about 8^h. No A.B. to 10^h.
 3 Ov't. Obs. impos. to 10½^h, and doubtless all night.
 4 M'y cl'r, but more cl'y in N. than elsewhere: no A.B. seen to 9¼^h, but
 5 Clear. No A.B. to 10^h. [obs. embarrassed.
 6 Ov't. Obs. impos. to 10^h: at 11^h n'y clear but hazy: no A.B. then.
 7 Clear, but hazy. No A.B. to 10^h.
 8 Ov't and raining. Obs. impos. to 10½^h, and doubtless all night.
 9 Clear. No A.B. to 10^h.
 10 Ov't, with dense haze. Obs. impos. to 10^h, and prob. all night.
 11 Almost wholly ov't. Obs. impos.
 12 Clear. No A.B. to 10^h.
 13 Ov't. Obs. impos. to 10^h. [being down.
 14 Clear: moon interf.: no A.B. seen to 10^h, and none at 11¾^h, moon
 15 Ov't.
 16 Clear, but hazy. No A.B. to 10^h. Moon. [ing down.
 17 Clear, but hazy: no A.B. to 10^h; none from 2^h to 3^h A. M., moon be-
 18 Clear. Moon. No A.B. to 9^h.
 19 Ov't. Obs. impos. to 10½^h, and doubtless all night.
 20 Clear. Moon. No A.B. seen to 10^h.
 21 Clear. Moon. No A.B. to 10^h.
 22 Ov't and raining part of time: obs. impos. to 10^h, and d's all night.
 23 Clear. Moon. No A.B. to 10^h.
 24 Ov't and raining. Obs. impos. to 10½^h, and doubtless all night.
 25 Clear. Moon. No A.B. to 10^h.
 26 Mostly clear to 9½^h; after that ov't. No A.B.
 27 Ov't. Obs. impos. to 10½^h, and doubtless all night.
 28 Mostly clear. No A.B. to 10^h.
 29 Ov't and raining. Obs. impos. to 9½^h, and doubtless all night.
 30 Clear. No A.B. to 10½^h.
 31 Clear. No A.B. to 10^h.
- June 1 Clear. No A.B. to 9¾^h.*
 2 Clear. No A.B. at 11¼^h. Within doors from 9^h to 11^h.
 3 Clear. No A.B. to 9½^h.
 4 Ov't. Obs. impos. to 10^h*
 5 Clear in N. and W. No A.B. to 9¾^h.
 6 Very clear. No A.B. to 10^h.
 7 Ov't. Obs. nearly impos. to 10^h, and doubtless later.
 8 Ov't. Obs. impos. to 10^h, and doubtless all night.
 9 Ov't; misty. Obs. impos. to 11^h, and doubtless all night.
 10 Very clear. No A.B. to 9¾^h.
 11 Clear. No A.B. to 10^h.
 12 Clear. Moon begins to interfere. No A.B. to 10^h.

June 1st.—About this time Mr. Francis Bradley also commenced an Auroral Register at New Haven.

June 4th.—A very considerable display of the A.B. seen at Rochester, N. Y. A zone from E. to W. about 9^h; then merry dancers in N., and after midnight, waves. See an account of the display, signed "Howard," in the *American Citizen*, Rochester, N. Y., June 11th.

1842.

- June 13 Ov't and raining. Obs. impos. to $10\frac{1}{4}^h$, and doubtless all night.
 14 Ov't with some rain: obs. impos. to 10^h , and doubtless all night.
 15 Ov't and raining. Obs. impos. to 11^h , and doubtless all night.
 16 Ov't. Obs. impos. to 10^h , and probably all night.
 17 Ov't, with slight rain: obs. impos. to $10\frac{1}{4}^h$, and doubtless all night.
 18 Ov't and showery. Obs. impos. to $10\frac{1}{2}^h$, and doubtless. all night.
 19 Mostly ov't, and some rain: obs. impos. to 10^h , and prob. all night.
 20 Mostly clear. Moon. No A.B. seen to 10^h .
 21 Clear. Moon. No A.B. seen to 10^h .
 22 Mostly ov't. Moon. No A.B. seen to 10^h , and obs. nearly impos.]
 23 Ov't. Obs. impos. to 10^h , and probably all night.
 24 Mostly ov't in N. Obs. impos. to $10\frac{1}{4}^h$, and probably later.
 25 Mostly ov't. Obs. impos. to 10^h 20^m , and probably all night.
 26 Clear after 9^h . No A.B. to 10^h . Thunder shower from $7\frac{1}{2}^h$ to $8\frac{1}{2}^h$.
 27 Ov't and rainy. Obs. impos. to 10^h , and doubtless all night.
 28 Ov't, and obs. impos. to 11^h at least. Clear at sunset.
 29 Clear. No A.B. to 10^h .
 30 Ov't. Obs. impos. to 11^h at least.
- July 1 Mostly ov't. Obs. nearly or quite impos. to $10\frac{1}{2}^h$.
 2 Ov't. Obs. nearly or quite impos. to $10\frac{1}{2}^h$.*
 3 Ov't. Obs. impos. to 10^h , and probably all night.
 4 P'y cl'r, but very hazy; m'y ov't after 10^h : obs. n'y or quite impos.
 5 Very hazy: no stars vis. below alt. of 40° : obs. n'y impos. to 10^h ,
 6 Ov't. Obs. impos. to 10^h at least. [and d's all night.
 7 Mostly ov't; wholly so after 10^h : obs. impos. to $10\frac{1}{2}^h$, and p. all n't.
 8 Ov't. Obs. impos. to 10^h , and probably all night.
 9 Ov't. Obs. impos. to 10^h , and probably all night.
 10 Clear. No A.B. to 10^h .
 11 Clear. No A.B. to 10^h .* (215)
 12 Clear, somewhat hazy about N. horizon.*
 13 Clear: moon begins to interfere: no A.B. seen to 10^h .
 14 Ov't except in S. Obs. impos. to $10\frac{1}{2}^h$.
 15 Ov't. Obs. impos. to 10^h , and probably all night.
 16 Nearly clear after 10^h . Moon.*
 17 Clear. Moon. No A.B. seen to 10^h .
 18 Clear. Moon. No A.B. seen to 10^h .
 19 Ov't. Obs. impos. to $9\frac{3}{4}^h$, and doubtless all night.
 20 Clear. Moon. No A.B. to $9\frac{3}{4}^h$.
 21 Mostly clear. Moon. No A.B. to $10\frac{1}{4}^h$.
 22 Clear. Moon. No A.B. seen to 11^h .
 23 After about $8\frac{1}{4}^h$ ov't. Obs. impos. to 10^h , and prob. much later.
 24 Much ov't. Moon. Obs. nearly impos. to $9\frac{3}{4}^h$. No A.B. noticed.
 25 Many cirrous cl'ds and much haze about N.: obs. n'y impos. to 10^h .
 26 Cl'ss, but hazy: moon after 9^h : no A.B. seen, but obs. uncertain.
 27 Ov't almost wholly to 10^h . Obs. impos.
 28 Dense haze up to alt. of 40° : obs. n'y impos. to 11^h : no A.B. seen.
 29 Ov't. Obs. impos. to $10\frac{1}{2}^h$, and doubtless later.
 30 Clear. No A.B. to 11^h . Within from $9\frac{3}{4}^h$ to 11^h .
 31 Ov't. Obs. impos. to 10^h , and doubtless later.

July 2d.—A narrow opening through clouds in N. horizon. Perhaps some unusual light beyond, but doubtful.

July 11th.—From 2h to 3h A. M. of 12th there was a fine auroral arch in N.

July 12th.—No A.B. to 10^h ; although about 10^h I suspected a very slight auroral bank in north; probably none.

July 16th.—Some slight cloudiness in N. illumined by the moon. Probably no A.B. to 10^h 15^m , but observation necessarily uncertain.

1842.

- Aug. 1 Very clear. No A.B. to 10 $\frac{1}{4}$ ^h.*
- 2 Clear. No A.B. to 10^h.
- 3 Ov't, with dense haziness, almost completely. Obs. impos. to 10^h.
- 4 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
- 5 Ov't; raining after 10 $\frac{1}{2}$ ^h. Obs. impos. to 10 $\frac{1}{2}$ ^h, and d's all night.
- 6 Ov't, with cl'ds and haze; some stars visible. Obs. impos. to 10 $\frac{1}{2}$ ^h.
- 7 Ov't; some rain. Obs. impos. to 9 $\frac{1}{2}$ ^h, and doubtless all night.
- 8 Partly ov't: no A.B. to 11^h, or d'g n't, but sky most of time cl'y.
- 9 Ov't to 9 $\frac{1}{2}$ ^h, after that m'y cl'r till about midnight: no A.B. to 12^h.
- 10 P'y clear to 11^h; after which, d'g rest of n't, ov't: no A.B. to 11^h.
- 11 Mostly ov't in N.; clear in S. Obs. impos. to 10^h.
- 12 Ov't. Obs. impos. to 10^h, and probably all night.
- 13 Mostly clear. Moon. No A.B. to 10^h.
- 14 Ov't in N. and elsewhere. Obs. impos. to 10^h.
- 15 Mostly clear. Moon. No A.B. to 9^h.
- 16 Ov't for the most part. Moon. Obs. nearly or quite impos. to 10^h.
- 17 Ov't; rain about 11^h. Obs. impos.
- 18 Mostly clear to 9^h, after that ov't. Moon. No A.B. seen.
- 19 Clear, but hazy about horizon. Moon. No A.B. seen to 10^h.
- 20 Clear. Moon. No A.B. to 9 $\frac{1}{2}$ ^h. None from 11 $\frac{1}{2}$ ^h to 12 $\frac{1}{2}$ ^h.
- 21 Clear. Moon. No A.B. to 9^h.
- 22 Clear. Moon. No A.B. to 10^h.
- 23 Clear. Moon.*
- 24 Mostly ov't. Obs. impos. to 10 $\frac{1}{2}$ ^h, and doubtless all night.
- 25 Mostly ov't. Obs. impos. to 10 $\frac{1}{4}$ ^h, and doubtless all night.
- 26 Ov't. Obs. impos. to 10^h, and doubtless all night.
- 27 Ov't. Obs. impos. to 11^h, and doubtless later.
- 28 Mostly clear after 9^h. No A.B. to 9 $\frac{1}{2}$ ^h.
- 29 Very clear. No A.B. to 10^h.
- 30 Very clear. No A.B. to 10^h.
- 31 Ov't. Obs. impos. to 9 $\frac{1}{2}$ ^h, and probably all night.
- Sept. 1 Clear. No A.B. to 10^h.
- 2 Very clear.* (216)
- 3 Ov't and rainy. Obs. impos. to 11^h, and doubtless later.
- 4 Ov't. Obs. impos. to 11^h, and doubtless later.
- 5 Clear. No A.B. to 10^h.
- 6 Clear. No A.B. to 10 $\frac{1}{2}$ ^h. Within doors from 8^h to 10^h.
- 7 Clear. No A.B. to 9 $\frac{1}{2}$ ^h.
- 8 Ov't. Obs. impos. to 10^h, and d's all night; raining most of night.
- 9 Nearly clear. No A.B. to 9 $\frac{1}{2}$ ^h.
- 10 Clear. No A.B. to 9 $\frac{3}{4}$ ^h.
- 11 Mostly clear: moon: no A.B. to 10^h. Thunder storm about 11^h.
- 12 Mostly clear. Moon. No A.B. seen to 10^h.
- 13 Mostly ov't. Obs. impos. to 11^h.
- 14 Ov't. Obs. impos. to 10^h, and probably all night.
- 15 Ov't. Obs. impos. to 10^h, and doubtless all night.
- 16 Ov't. Obs. impos. to 10^h, and doubtless all night.

Aug. 1st.—A very faint light in N. from Ursa Major to Perseus, about 5° altitude, which I suppose may be zodiacal.

Aug. 22d.—No A.B. to 10h 30m, unless a luminous stripe which I saw at 10h 10m was auroral. It was a dim belt extending from E. to W., not seen lower than about 40° on E. and 30° on W., its lower edge near β and γ Draconis and ϵ Cassiopeiae. No auroral appearance in N. By 10h 20m the belt was almost extinct. I am on the whole inclined to think it may have been a cloud.

Sept. 2d.—Mr. F. Bradley saw several auroral streamers; about 8h 30m also slight auroral bank about 4° high.

1842.

- Sept. 17 Clear. Moon. No A.B. seen to 10^h. [pos. aft. 8^h to 10^h and later.
 18 Cl'r at 7¹/₂^h: soon aft. ov't and r'y: moon: no A.B. seen, but obs. im-
 19 Clear. Moon. No A.B. seen to 10^h.
 20 Clear. Moon. No A.B. seen to 10^h.
 21 Clear. Moon. No A.B. seen to 10^h.
 22 M'y clear, but cloudy in N.: moon: obs. n'y or quite impos. to 9^h.
 23 Mostly clear. Moon interferes after 8^h. No A.B. seen to 10^h.
 24 Clear. Moon interferes in part. No A.B. seen to 10^h.
 25 Clear. No A.B. to 10^h. Moon after 9^h.
 26 Clear. No A.B. to 10^h.
 27 Clear, but som't hazy. No A.B. to 10^h. [E. C. H. at New York.]
 28 Clear. No A.B. seen to 9^h.* (217)
 29 M'y cl'r to 9^h, after which too cl'y for obs. No A.B. to 9^h.
 30 Clear. No A.B. to 10^h.
 Oct. 1 Clear, except low cloud in N. No A.B. to 10^h.
 2 Clear. No A.B. to 9^h.
 3 Clear. No A.B. to 10^h.
 4 Clear. No A.B. to 10^h.
 5 Clear. No A.B. to 10^h.
 6 Clear. No A.B. to 10^h.
 7 Clear most of evening. No A.B. to 10^h.
 8 Ov't most of evening. Obs. impos. to 10^h. [n'y impos.
 9 Ov't chiefly; at 10^h p'y cl'r in E. and S.E.: no A.B. seen, and obs.
 10 Mostly cl'r: moon begins to interf.: no A.B. to 10^h: within most of
 11 Clear. Moon interferes. No A.B. seen to 9¹/₂^h. [evening.
 12 Clear. Moon. No A.B. to 10¹/₂^h.
 13 Mostly clear. Moon. No A.B. to 10^h.
 14 Ov't. Obs. impos. to 10^h.
 15 Clear. Moon. No A.B. to 10^h.
 16 Hazy. Moon. No A.B. seen to 10^h, but obs. necessarily uncertain.
 17 Hazy, and thinly clouded in N. Moon. Obs. unc. No A.B. seen.
 18 Mostly ov't: moon: obs. impos. to 10^h, and prob. most of night.
 19 Mostly clear. Moon. No A.B. seen to 10^h.
 20 Clear most of evening; cloudy at 10^h. No A.B. to 10^h. Moon.
 21 Clear. Moon. No A.B. seen to 10^h.
 22 Ov't and rainy. Obs. impos. to 10^h, and doubtless much later.
 23 Clear. No A.B. to 10^h. [d's all night.
 24 Ov't at 9^h and aft.: before too hazy for obs.: obs. impos. to 10^h, and
 25 Ov't. Obs. impos. to 10^h at least.
 26 Clear at New York. No A.B. to 10^h.
 27 Clear at New York. No A.B. to 10^h.
 28 Clear at New York. No A.B. to 10^h. [from N. Y.]
 29 N'y cl'r, but hazy about hor.: no A.B. to 10^h. [E. C. H. on passage
 30 Very hazy below alt. of 20°: obs. n'y impos. to 10^h: no A.B. seen.
 31 Very hazy below alt. of 30°: obs. n'y impos. to 9^h: no A.B. seen.
 Nov. 1 Too hazy for obs. below alt. of 30°. No A.B. seen to 9¹/₂^h.
 2 Clear. No A.B. to 10^h.
 3 Clear.*
 4 Clear. No A.B. to 10^h.
 5 Clear, but somewhat hazy. No A.B. to 9¹/₂^h.
 6 Too cloudy for obs. to 10^h at least, and probably all night.
 7 Ov't. Obs. impos. to 9^h, and doubtless all night.

Sept. 28th.—Auroral streamers seen about 11h by Mr. W. B. Bristol and Mr. R. W. Forbes.

Nov. 3d.—Some faint illumination suspected about 9h 30m, but doubtful whether any A.B.

1842.

- Nov. 8 Ov't. Obs. impos. to 11^h, and doubtless all night.
 9 Ov't most of ev'g; clearing away at 9^h, but ov't in N. to 10^h at least.
 10 Clear early in evening: moon interferes: no A.B.: ov't after 9^h.
 11 Cl'r: moon: no A.B. according to Mr. F. Bradley's obs.: I c'd not
 12 Ov't, with some rain. Obs. impos. to 10^h at least. [observe.
 13 Somewhat cloudy. Moon. No A.B. seen.
 14 Ov't and rainy. Obs. impos. to 10^h, and doubtless later.
 15 Al't wh'y ov't: obs. nearly or quite impos. to 10¹/₂^h: ov't in morn.
 16 Ov't. Obs. impos. to 10^h, and doubtless all night.
 17 Ov't and rainy. Obs. impos. to 11^h, and throughout the night.
 18 Clear. Moon. No A.B. seen to 8^h.
 19 Clear. Moon. No A.B. seen to 10^h.
 20 Mostly clear. Moon. No A.B. seen to 10^h.
 21 Clear after about 6¹/₂^h.
 22 Clear. Moon. No A.B. seen to 11^h.
 23 Clear until about 8^h. No A.B. After that ov't.
 24 Mostly clear. No A.B. to 10^h.
 25 Ov't: obs. impos. to 10^h; p'y cl'r between 10^h and 11^h, but cl'y in N.
 26 Cl'r early part of ev'g: no A.B.: ov't at 9^h and after; p. all night.
 27 Clear. No A.B. to 10^h.
 28 Clear. No A.B. to 11^h.
 29 Clear. No A.B. to 11^h.
 30 Ov't and snowing. Obs. impos. to 9^h, and doubtless all night.
- Dec. 1 Cl'r and violent cold wind: no A.B. to 12^h: within most of the time.
 2 Clear to about 9^h. No A.B. After that ov't.
 3 Clear. No A.B. to 10¹/₂^h.
 4 Ov't. Obs. impos. to 9^h, and doubtless all night.
 5 Ov't and raining: obs. impos. to 10^h; clearing off about that time.*
 6 Ov't. Obs. impos. to 11^h, and doubtless all night.
 7 P'y cl'r until about 8^h; after that ov't: moon interf.: no A.B. seen.
 8 Ov't and raining. Obs. impos. to 9^h, and doubtless all night.
 9 Ov't to about 7¹/₂^h; clear to about 9¹/₂^h: moon interf.: no A.B. vis.
 10 Partly cl'r in N. from 6^h to 7¹/₂^h: moon: no A.B.: too cl'y aft. to 10^h.
 11 Ov't. Obs. impos. to 10^h, and probably all night.
 12 Ov't to 11^h, and doubtless all night. Obs. impos.
 13 Ov't and snowing. Obs. impos. to 11^h, and doubtless all night.
 14 Clear most of evening. Moon. No A.B. seen to 11^h.
 15 Clear. Moon. No A.B. seen to 10¹/₂^h.
 16 Clear and cloudy by turns: moon: no A.B. seen to 10^h; obs. imperf.
 17 Ov't. Obs. impos. to 10¹/₂^h, and doubtless later.
 18 Clear. Moon. No A.B. seen to 10^h.
 19 Clear. Moon. No A.B. seen to 9^h.
 20 M'y cl'r to 8^h: no A.B.: aft. p'y cl'y and moon interf.: ov't in morn.
 21 Ov't and raining. Obs. impos. to 9^h, and doubtless all night.
 22 Ov't. Obs. impos. to 11^h at least.
 23 Very clear. No A.B. to 10^h.
 24 Clear. No A.B. to 11^h.
 25 Clear early in evening. No A.B. After 8^h ov't to 10^h at least.

Nov. 10th.—Probably no A.B., although at times there appeared to be some unusual light among the fleecy clouds in N.; perhaps only lunar illumination.

Nov. 21st.—A considerable display of the A.B., commencing as early as 6^h, and continuing as late as 10^h 30^m at least. There was no great activity. About 90° horizontal extent illumined, and no streamers reached above 35° while I watched. There was frequently a well defined arch; then large luminous spots; occasional streamers.

Dec. 5th.—At 2^h A. M. of 6th the sky was clear, and there appeared to be some auroral light in N., but not certain.

1842.

- Dec. 26 Ov't. Obs. impos. to 9^h, and probably all night.
 27 Ov't. Obs. impos. to 10^h. Clear at daybreak of 28th.
 28 Clear. No A.B. to 10^h.
 29 Ov't and snowing copiously: obs. impos. to 10^h, and d's all night.*
 30 Clear. No A.B. to 11^h.
 31 Clear. No A.B. to 11^h.

1843.

- Jan. 1 Cl'y in part; tolerably cl'r about 11^h: no A.B. to 11^h: ov't in morn.
 2 Ov't. Obs. impos. to 12^h, and doubtless all night.
 3 Clear. No A.B. to 11^h. No A.B. between 5^h and 6^h of 4th.
 4 Mostly clear. No A.B. to 10^h.
 5 Ov't. Obs. impos. to 10^½^h, and doubtless all night.
 6 Ov't and drizzly. Obs. impos. to 11^h, and doubtless all night.
 7 Ov't, misty and rainy. Obs. impos. to 11^h, and d's all night.
 8 Ov't and drizzly. Obs. impos. to 10^h, and doubtless all night.
 9 Ov't, misty. Obs. impos. to 11^h, and doubtless all night.
 10 Ov't, misty and showery. Obs. impos. to 11^h, and d's all night.
 11 Ov't. Obs. impos. to 10^¾^h, and doubtless all night.
 12 Ov't and misty. Obs. impos. to 10^½^h, and doubtless all night.
 13 Mostly clear. Moon. No A.B. seen to 10^h.
 14 Mostly cloudy. Moon. No A.B. seen to 11^h, and obs. n'y impos.
 15 Clear. Moon. No A.B. to 10^h. Could not myself observe.
 16 Clear. Moon. No A.B. to 9^½^h.
 17 Clear. Moon. No A.B. to 10^h.
 18 Clear. No A.B. to 11^h.
 19 Much clouded. Obs. nearly impos. No A.B. seen to 11^h.
 20 Tolerably clear. No A.B. seen to 11^h.
 21 Clear. No A.B. to 11^½^h.
 22 Clear. No A.B. to 10^h.
 23 Ov't. Obs. impos. to 11^½^h.
 24 Considerably clouded about the N.*
 25 Very clear. No A.B. to 11^h.
 26 Very clear. No A.B. to 11^h.
 27 Ov't. Obs. impos. to 12^h, and doubtless all night.
 28 Ov't. Obs. impos. to 11^h at least.*
 29 Clear. No A.B. to 11^h.
 30 M'y ov't: obs. nearly if not quite impos. to 11^h, and d's all night.
 31 Ov't early in ev'g; cl'ring about 9^h; at 11^h very cl'r: no A.B. then.
 Feb. 1 Ov't most of ev'g; p'y cl'r before 8^h, but obs. n'y impos.: no A.B.
 2 Clear. No A.B. to 10^½^h. [seen.
 3 Ov't. Obs. impos. to 10^½^h, and probably all night.
 4 Al't entirely ov't in N.: obs. n'y or quite impos. to 11^h, and p. all n't.
 5 Ov't. Obs. impos. to 10^h, and doubtless all night.
 6 Obsc. by cl'ds: moon interf.: no A.B. seen to 10^h: obs. imperfect.
 7 Cl'r early in ev'g; after 8^½^h too cl'y for obs. to 10^½^h: no A.B. seen.
 8 Mostly clear. No A.B. seen to 10^½^h. Moon.
 9 Clear. Moon. No A.B. seen to 11^½^h.
 10 Ov't. Obs. impos. to 10^h, and doubtless all night.
 11 Clear. No A.B. to 10^h.

Dec. 29th.—About 9^h, while snow was falling thick and fast, the burning of a Paper Mill very near West Rock (three miles distant) caused an appearance in the heavens like that of the great Aurora Borealis of Nov. 14th, 1837, 6^h P. M.; the entire concave being illuminated with a fine rosy light.

Jan. 24th.—A luminous spot in the N.N.W. about 9^h 15^m; caused, without doubt, by a burning barn at Watertown.

Jan. 28th.—A.B. seen at Edinburgh. R. D. Paul, *Jameson's Edin. New Philos. Jour.*, April, 1844, p. 376; no details.

1843.

- Feb. 12 Mostly ov't. Obs. nearly impos. to 10^h. Moon. No A.B. seen.
 13 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 14 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 15 M'y cl'r: moon: no A.B. seen to 11¹/₂^h: within doors most of ev'g.
 16 Clear. No A.B. to 10^h.
 17 Too cloudy for obs. most of evening. At 11^h nearly clear.
 18 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 19 Ov't. Obs. impos. to 11^h, and doubtless later.
 20 Ov't. Obs. impos. to 11^h, and doubtless all night.
 21 Clear most of evening. No A.B. to 10¹/₂^h: at 11^h ov't.
 22 Ov't until about 9^h; after that mostly clear. No A.B. to 10^h.
 23 Very clear. No A.B. to 10¹/₂^h.
 24 Partly clear, but hazy. No A.B. seen to 10¹/₂^h.
 25 Clear. No A.B. to 10¹/₂^h.
 26 Mostly clear, but at times ov't in N. No A.B. to 9¹/₄^h.
 27 Clear. No A.B. to 11^h. Within doors most of evening.
 28 Ov't. Obs. impos. to 9¹/₂^h, and doubtless all night.
- March 1 Ov't most of ev'g; cl'r to 7^h and at 11^h: no A.B. either time. [F.B.]
 2 Clear. No A.B. to 10^h, and none at 4¹/₂^h to 5^h of 3d.
 3 Clear. No A.B. to 10¹/₂^h.
 4 Very clear. No A.B. to 10¹/₂^h.
 5 Very clear. Moon begins to interfere. No A.B. seen to 10^h.
 6 Very clear. Moon.* (218)
 7 Clear. No A.B. to 10^h.
 8 Almost wholly ov't. Obs. impos. to 11^h.
 9 Cl'r in part, but obs. much embarrassed: moon: no A.B. seen to 10^h.
 10 Ov't and rainy. Obs. impos. to 11^h, and doubtless all night.
 11 Very clear. Moon. No A.B. certainly seen.*
 12 Wholly ov't. Obs. impos. to 10^h, and doubtless all night.
 13 Ov't and raining: obs. impos. to midnight: cl'ds then breaking up.
 14 Very clear. Moon. No A.B. seen to 9^h.
 15 Ov't. Moon. Obs. nearly impos. to 9^h.
 16 Ov't; snowing after 8^h. Obs. impos. to 10^h.
 17 Clear. A decided A.B. to 8^h, when the moon rose.* (219)
 18 Al't wh'y ov't: obs. impos. to 10^h: partly clear after 10³/₄^h to 11^h.
 19 Ov't. Obs. impos. to 10^h.
 20 Mostly clear to 8^h; after that too cloudy for obs.: no A.B. seen to 8^h.
 21 Mostly clear. No A.B. to 9¹/₂^h.
 22 Almost wholly ov't. Obs. impos. to 9¹/₂^h, and probably all night.
 23 Clear to about 10^h, when the sky was hazy: no A.B. seen: within
 24 Clear. No A.B. to 9¹/₄^h [doors most of evening.
 25 Mostly clear. No A.B. to 10^h.
 26 Mostly clear. No A.B. to 10^h.
 27 Ov't; snowing and rain. Obs. impos. to 11^h, and d's all night.
 28 Ov't to 7^h; m'y cl'r at 9^h, but soon grew hazy: no A.B. seen to 10¹/₂^h.
 29 Tolerably clear. No A.B. to 10¹/₂^h.*

March 6th.—Fine display of the A.B. Light first seen as soon as darkness permitted observation, about 7h. Seen as late as 11h; not watched very thoroughly. Scarcely any streamers; a distinct arch 5° or 8° high at times, and luminous spots in the arch. About 100° on horizon illumined. Scarcely any trace visible at 4h 30m A. M. of 7th.

March 11th.—Yet there seemed to be some unusual light around the N. horizon. Probably not an A.B.

March 17th.—None seen after to 9h, but no careful observation made. A general auroral light in N. horizon; no streamers reported. Being occupied, did not see the A.B.

March 29th.—A.B. seen at Dunse and Makerstoun, Scotland.—Mentioned in *London Atheneum*, May, 1843.

1843.

- Mar. 30 Ov't, and obs. impos. to 11^h, and doubtless all night.
 31 Ov't; sleet falling. Obs. impos. to 10^h, and doubtless all night.
- April 1 Clear. No A.B. to 10½^h.
 2 Very clear. Moon begins to interfere; setting at 9½^h.
 3 Very clear. Moon interferes. No A.B.
 4 Ov't. Obs. impos. to 10½^h, and doubtless all night.
 5 Ov't. Obs. impos. to 10^h. Clouds then breaking up.*
 6 Clear. Moon interferes.* (220)
 7 Mostly cl'r until about 9^h; after that n'y ov't: moon: no A.B. seen.
 8 Chiefly clear. Moon. No A.B. seen to 10½^h.
 9 Clear. Moon. No A.B. to 10^h.
 10 Clear. Moon. No A.B. to 12^h. Within most of the time.
 11 Clear. Moon. No A.B. to 10^h. None from 1^h to 2^h of 12th.
 12 Clear. Moon. No A.B. to 10½^h.
 13 Ov't. Obs. impos. to 11^h. Began to sprinkle about 11^h.
 14 Ov't. Obs. impos. to 10^h, and doubtless all night.
 15 Ov't and foggy. Obs. impos. to 11^h, and doubtless all night.
 16 Very hazy: stars vis. above alt. of 20° or 30°: no A.B. seen to 10^h.
 17 Ov't; gentle rain. Obs. impos. to 11½^h, and doubtless all night.
 18 Ov't. Obs. impos. to 10^h, and doubtless all night.
 19 Ov't. Obs. impos. to 11^h, and doubtless all night.
 20 Very clear. No A.B. to midnight.
 21 Clear. No A.B. to 11^h.
 22 Al't wholly ov't. Obs. impos. to 10½^h, and doubtless all night.
 23 Ov't; slight drizzle. Obs. impos. to 10^h, and doubtless all night.*
 24 Clear. No A.B. to 12^h. Within doors most of evening.
 25 Al't wholly ov't. Obs. impos. to 10½^h, and doubtless all night.
 26 Ov't. Obs. impos. to 10^h, and doubtless all night.
 27 Almost wholly ov't. Obs. impos., or nearly so, to 10^h.
 28 Clear. No A.B. to 10^h. [No A.B. seen.
 29 M'y ov't: stars seen above alt. of 35°: obs. n'y impos. to 10^h at least.
 30 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
- May 1 Clear. No A.B. to 10^h.
 2 Clear. No A.B. to 10^h. Within from 8^h to 10^h.
 3 Ov't. Obs. impos. to 9½^h at least.
 4 Clear. Moon. No A.B. to 10^h.
 5 Sufficiently clear in N. to 8½^h. Moon. No A.B. seen: at 9½^h ov't.
 6 Ov't. Obs. impos. to 10^h, and doubtless all night.*
 7 Ov't, clouds broken at times. Obs. impos. to 10^h, and d's all night.
 8 Clear in N. Moon. No A.B. to 10^h.
 9 Nearly ov't with broken clouds. Obs. impos. to 10^h.
 10 Ov't. Obs. impos. to 10^h, and probably all night.
 11 Nearly ov't; clear along N. horizon. Moon. No A.B. seen to 10^h.
 12 Clear. Moon. No A.B. seen to 10^h.
 13 Clear. Moon. No A.B. seen to 10^h.*
 14 Som't obsc. by haze and thin clouds: moon: no A.B. seen to 10^h.

April 5th.—A.B. seen at Edinburgh, April 5th and 6th.—R. D. Paul, *Jameson's Edin. New Phil. Jour.*, 1844, p. 378. No details.

April 6th.—A.B. visible all the evening, but I did not watch it specially. I saw no streamers, but only irregular spots and luminous arcuate banks. About 8^h there was an arch nearly 20° high.

April 23d.—A.B. seen at Edinburgh. R. D. Paul, *Jameson's Edin. New Phil. Jour.*, April, 1844, p. 378; no details.

May 6th.—A.B. seen in France. *Comptes Rendus*, xvi, p. 1092, etc.

May 13th.—Something like an auroral belt seen in New York City between 12^h 30m and 1^h A. M.; a streak spanning the hemisphere from N.W. to S.E.—*N. Y. Evangelist*, May 18th, 1843.

1843.

- May 15 Hazy. Moon. No A.B. seen to 11^h. Within from 8½^h to 11^h.
 16 Clear. No A.B. to 10^h. Cloudy at 11^h. [F. B.]
 17 Dense haze: most of stars obs.: obs. n'y imp. to 10^h: no A.B. susp.*
 18 Hazy: no A.B. seen to 10^h: a faint aur. c'd not have been detected.
 19 Ov't. Obs. impos. to 10^h at least.
 20 Clear. No A.B. to 10^h.
 21 Cloudless, but hazy. No A.B. to 10^h. [have been seen.
 22 Cloudless, but hazy: no A.B. seen to 10^h: a faint display could not
 23 Ov't after close of twilight to 10^h. Obs. impos.*
 24 Serene and beautiful. No A.B. to 10½^h.
 25 Clear. No A.B. to 10^h.
 26 Ov't. Obs. impos. to 9^h, and doubtless all night.
 27 Ov't. Obs. impos. to 10^h, and prob. all night. [have been seen.
 28 P'y cl'r; obs. about hor.: no A.B. seen to 9½^h: a faint A.B. c'd not
 29 Ov't. Obs. impos. to 10^h, and probably all night.
 30 Clear. No A.B. to 10¼^h.
 31 Too hazy and cloudy for obs. to 10^h, and doubtless later.
- June 1 Mostly clear. Moon begins to interfere. No A.B. to 10½^h.
 2 Cloudless, but hazy. No A.B. to 10^h.
 3 Mostly ov't. Obs. impos. to 10^h at least.
 4 Ov't. Obs. impos. to 10^h, and probably all night.
 5 Mostly ov't. Obs. impos. to 10½^h, and probably all night.
 6 Nearly clear. Moon interferes. No A.B. seen to 10½^h.
 7 Mostly ov't. Obs. nearly or quite impos. to 10½^h. [10^h and 11^h.
 8 Ov't: obs. impos. to 10^h, and d's all night: thunder shower between
 9 Mostly clear. Moon. No A.B. seen to 10^h.
 10 Mostly clear. Moon. No A.B. observed to 10^h.
 11 Mostly clear. Moon. No A.B. noticed to 10^h. Within to 9½^h.
 12 Serene and beautiful. Moon. No A.B. to 10½^h.
 13 Ov't. Obs. impos. to 10^h at least.
 14 Mostly clear. No A.B. to 10^h.
 15 Considerably obscured by clouds and haze. No A.B. seen to 10^h.
 16 Beautifully clear between 9^h and 10^h, and perhaps later.
 17 Clear. No A.B. to 10½^h.
 18 Very clear. No A.B. to 10^h.
 19 Clear and beautiful. No A.B. to 10¼^h.
 20 Clear. No A.B. to 10^h.
 21 Clear. No A.B. to 11^h.
 22 Very clear. No A.B. to 11^h.
 23 Clear. No A.B. to 11½^h.
 24 Ov't. Obs. impos. to 11^h at least.
 25 Clear. No A.B. to 10^h.
 26 Clear. No A.B. to 11^h.
 27 Clear. No A.B. to 10^h; somewhat hazy.
 28 Mostly ov't in N. to 10^h; about 10½^h tolerably clear, and no A.B.
 29 Ov't. Obs. impos. to 10^h at least.
 30 Clear. A slight A.B.; first noticed about 10^h.* (221)
- July 1 Clear, yet hazy and dusty about horizon. No A.B. to 10½^h.
 2 Ov't. Obs. impos. to 10^h, and doubtless later.
 3 Clear and splendid. No A.B. to 11^h.

May 17th.—A.B., moderate, seen by Mr. Thos. R. Dutton at Litchfield, Ct.

May 23d.—A moderate A.B. seen between clouds by Mr. Thos. R. Dutton at Goshen, Ct.

June 30th.—Watched about half an hour. A general illumination, at times quite bright through about 50° of horizon, extending upward 3° or 4°. A dim, low arch, but I saw no streamers.

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- July 4 Ov't for the most part. Obs. impos. to 10^h.
 5 Mostly clear. Moon. No A.B. to 10^h.
 6 Clear. Moon. No A.B. to 9½^h.
 7 Clear. Moon. No A.B. to 11^h.
 8 Mostly clear; floating clouds. Moon. No A.B. to 10^h.
 9 Mostly ov't. Obs. impos. to 10^h.
 10 Ov't in N. Obs. impos. to 10½^h.
 11 Ov't. Obs. impos. to 11^h.
 12 Very clear. Moon. No A.B. seen to 11^h.
 13 Ov't. Obs. impos. to 10½^h.
 14 Mostly ov't. Obs. impos. to 10½^h.
 15 Clear. Moon. No A.B. seen to 10¼^h.
 16 Mostly clear. No A.B. to 10^h.
 17 Ov't. Obs. impos. to 10¼^h, and probably all night.
 18 Clear. No A.B. to 10½^h.* [Within from 9^h to 11^h.
 19 Cl'r to 10½^h: no A.B. according to F. B.: ov't at 11^h, and obs. impos.
 20 Clear, very clear. No A.B. to 9½^h.
 21 Beautifully clear. No A.B. to 10¼^h.
 22 Mostly clear except in N. No A.B. seen to 10^h, but obs. uncertain.
 23 Clear. No A.B. to 9¾^h.
 24 Ov't to 9^h or 9½^h, and obs. impos.
 25 Mostly clear; some narrow clouds in N. A.B. seen.* (222)
 26 Clear, although somewhat hazy. No A.B. to 10½^h.
 27 Clear. No A.B. to 11^h.
 28 Clear after 9^h. No A.B. to 10^h.
 29 Mostly clear. No A.B. to 9½^h.
 30 Ov't and raining. Obs. impos. to 9½^h, and doubtless all night.
 31 Ov't. Obs. impos. to 11^h, and probably all night.
- Aug. 1 M'y cl'r after 9^h; cl'ds chiefly in N.: no A.B. to 10¼^h: obs. imperf.
 2 Dense haze; obs. below alt. of 20° n'y impos.: no A.B. susp. to 10½^h.
 3 Clear. Moon interferes. No A.B. seen to 10½^h.
 4 Clear; moon: no A.B. seen to 10¼^h. [None at 2^h A.M. (F. B.)]
 5 Ov't. Obs. impos. to 10^h, and d's all night. Heavy shower in night.
 6 Ov't: obs. impos. to 9^h at least, and to 10½^h as reported: clear from
 7 Ov't to 9½^h, and doubtless all night. Obs. impos. [12^h to morn.
 8 Ov't. Obs. impos. to 10½^h, and d's all night. Raining after 12^h.
 9 Ov't. Obs. impos. to 10^h, and doubtless all night.
 10 Ov't and raining to 10¼^h at least. Obs. impos. during whole night.
 11 M'y ov't: moon at intervals: obs. n'y impos. to 9^h, and d's later.
 12 Fleecy cl'ds obsc. the N. at times: moon: no A.B. seen, but obs. unc.
 13 Clear. Moon. No A.B. to 9^h.
 14 Clear to 10^h. Moon. No A.B.
 15 Very clear. No A.B.
 16 Splendidly clear most of evening. No A.B. to midnight.
 17 Splendidly clear to 10^h at least. No A.B. to 10^h.
 18 Clear. No A.B. to 11^h.
 19 Clear. No A.B. to 10^h.
 20 Ov't and r'y about 9½^h and onward: obs. impos. to 10^h, and all night.
 21 Ov't. Obs. impos. to 10½^h, and no doubt all night.

July 18th.—Nathaniel R. Clark, Esq., informs me that at Saratoga, N. Y., he saw between 9^h and 10^h an A.B. in the west: perhaps it is a mistake.

July 25th.—A moderate display observed from 9^h to 10^h, and going on at 10^h. A horizontal extent of about 80° illumined; groups of streamers shot up here and there, soon fading; not very brilliant: reaching at the highest about 25° or 30°. Some of the streamers moved westwardly.

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- Aug. 22 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.*
 23 Ov't. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night.
 24 Clear, but somewhat hazy. No A.B. to 11^h .
 25 Clear. No A.B. to 11^h .
 26 Mostly clear. No A.B. to $10\frac{1}{2}^h$.
 27 Clear. No A.B. to 10^h .
 28 Ov't chiefly. Obs. nearly impos. to 12^h . No A.B. seen.
 29 Ov't. Obs. impos. to 11^h .
 30 Clear. No A.B. to 10^h .
 31 Clear. No A.B. to $10\frac{1}{2}^h$.
 Sept. 1 Ov't. Obs. impos. to 11^h , and probably all night. [seen.
 2 M'y cl'r: moon: no A.B. to $10\frac{1}{4}^h$: a mod. display c'd not have been
 3 Ov't. Obs. impos. to 10^h , and probably all night.
 4 Mostly ov't. Obs. impos. to 11^h .
 5 Ov't. Obs. impos. to 11^h .
 6 Ov't. Obs. impos. to 11^h .
 7 Ov't. Obs. impos. to 11^h .
 8 Clear and beautiful. Moon interferes. No A.B. seen to $10\frac{1}{2}^h$.
 9 Very clear. Moon. No A.B. seen to $10\frac{1}{2}^h$.
 10 Ov't. Obs. impos. to 10^h , and doubtless all night.
 11 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 12 Clear. Moon. No A.B. seen to $10\frac{3}{4}^h$.
 13 Much obscured by clouds. Moon. Probably no A.B. to 10^h .*
 14 Ov't. Obs. impos. to $10\frac{1}{4}^h$, and no doubt all night.
 15 No obs. to 8^h . Aft. ov't and obs. impos. to 10^h , and prob. all night.
 16 Exceedingly clear. No A.B. to 11^h .
 17 Cl'r until about 8^h , and no A.B.: after that ov't to 10^h , and p. all n't.
 18 Clear in S. early in ev'g; mostly ov't by 8^h ; obs. impos. to 10^h .
 19 About half clear; scattered clouds and some haze. No A.B. to 10^h .
 20 Almost wholly ov't. Obs. impos. to $10\frac{1}{2}^h$, and probably all night.
 21 Mostly clear. No A.B. to 11^h .
 22 Clear. No A.B. to $10\frac{1}{2}^h$.
 23 Clear. No A.B. to $10\frac{1}{2}^h$.
 24 Clear. No A.B. to 10^h .
 25 Ov't and rainy. Obs. impos. to $10\frac{1}{4}^h$, and probably all night.
 26 Ov't and rainy. Obs. impos. to 10^h , and doubtless later.
 27 Very clear. A.B. from $7\frac{1}{2}^h$.* (223)
 28 Mostly clear. No A.B. to 10^h .
 29 Clear. Moon interferes. No A.B. seen to $8\frac{1}{2}^h$.
 30 Clear. Moon. No A.B. to 10^h .
 Oct. 1 Ov't and raining. Obs. impos. to 10^h , and doubtless all night.
 2 Clear. Moon. No A.B. seen to 10^h .
 3 Clear, except cloudy in N. after 10^h . Moon. No A.B. to 10^h .
 4 Mostly ov't in N. Moon. No A.B. seen to 9^h , but obs. n'y impos.
 5 Half clear. Moon. No A.B. seen to 11^h , but obs. very imperfect.
 6 Mostly ov't. Obs. impos. to 9^h , and probably all night.
 7 Ov't and raining. Obs. impos. to $9\frac{1}{2}^h$, and no doubt all night.
 8 Ov't. Obs. impos. to 10^h .
 9 Nearly clear. Moon. No A.B. seen to 10^h .
 10 Clear. Moon. No A.B. seen to 10^h .

Aug. 22d.—A.B. seen at Edinburgh. R. D. Paul, *Jameson's Edin. New Phil. Jour.*, April, 1844, p. 378; no details.

Sept. 13th.—Yet through an opening in the clouds in the north there seemed to be some unusual light, but probably it was nothing more than moonlight.

Sept. 27th.—Sundry streamers 8° or 10° high and spots; arch 3° or 4° high.

1843.

- Oct. 11 Clear. Moon. No A.B. seen to $10\frac{1}{4}^h$.
 12 Ov't to about $9\frac{1}{2}^h$, when cl'ds began to break up. Obs. impos. to $9\frac{1}{2}^h$.
 13 Clear. No A.B. to $10\frac{1}{2}^h$.
 14 Very clear. A slight A.B. beginning at close of twilight.* (224)
 15 Ov't: obs. impos. to 9^h ; p'y cl'r high in N. but not enough so for obs.
 16 Ov't. Obs. impos. to 10^h , and doubtless later.
 17 Clear. No A.B. to 10^h .
 18 Mostly ov't. Obs. nearly impos. to 11^h . No A.B. seen.
 19 Clear. No A.B. to 10^h .
 20 Clear. No A.B. to 9^h .
 21 Ov't. Obs. impos. to 10^h , and probably all night.
 22 Ov't. Obs. impos. to 10^h , and doubtless all night.
 23 Clear. No A.B. to 10^h .
 24 P'y cl'r; no A.B. to 11^h . [F. B.] At N. Y. cl'r; no A.B. to 10^h .
 25 Partly clear, and no A.B. to $10\frac{1}{2}^h$. [F. B.] At N. Y. do.
 26 Wholly ov't to 10^h . [F. B.] At N. Y. do. [A.B. seen.
 27 Ov't, d's all night. At N. Y. cl'y and obs. n'y impos. to $10\frac{1}{2}^h$: no
 28 Mostly clear. No A.B. seen to $10\frac{1}{2}^h$.
 29 Clear. Moon. No A.B. seen to $9\frac{3}{4}^h$.
 30 Clear. Moon. No A.B. to $10\frac{1}{4}^h$.
 31 Clear. Moon. No A.B. seen to 10^h . No A.B. at 5^h A.M., Nov. 1st.
- Nov. 1 Mostly ov't. Obs. impos. to 10^h .
 2 Mostly ov't: moon: no A.B. seen to 10^h ; c'd not watch personally.
 3 Mostly clear. Moon. No A.B. seen to 8^h .
 4 Mostly clear. Moon. No A.B. seen to 10^h .
 5 Clear and cold. Moon. No A.B. seen to 10^h . [seen to 10^h .
 6 Mostly cl'r. No A.B. to $10\frac{1}{2}^h$. [F. B.] E. C. H. at N. Y.; no A.B.
 7 Cl'y and snowy to 10^h : obs. impos. [F. B.] Obs. impos. on Hudson
 8 Clear in N. and W. No A.B. Ov't at 12^h . [F. B.] [river.
 9 Cl'y, d's all n't. [F. B.] At Albany p'y cl'y to 8^h ; no A.B. seen; obs.
 10 Cloudy to 11^h , and later. [F. B.] Do. at Albany. [unc.
 11 Cl'y to $9\frac{1}{2}^h$ in N. and W. [F. B.] At Utica snow; obs. impos. to 9^h .
 12 Cl'r to 9^h , and no A.B. [F. B.] At Utica obs. impos. to 9^h , d's all n't.
 13 M'y cl'y; at $11\frac{1}{2}^h$ cl'y in N. [F. B.] At Auburn at 10^h cl'r; no A.B.
 14 Cl'r: no A.B. to 10^h . [F. B.] Do. bet'n Rochester and Canandaigua.
 15 Cl'y, and d's all night. [F. B.] Do. at Geneva, N. Y.
 16 Cl'y to $10\frac{1}{2}^h$. [F. B.] Obs. impos. all n't between Rome and Albany.
 17 Cl'y, d's all n't. [F. B.] Obs. impos. bet'n Albany and West Point.
 18 Clear, and no A.B. to 10^h .
 19 Clear. No A.B. to 10^h .
 20 Very hazy; stars scarcely vis.: no A.B. seen to 10^h : obs. n'y impos.
 21 Clear. No A.B. to 10^h .
 22 Clear. No A.B. to $10\frac{3}{4}^h$.
 23 Almost wholly ov't. Obs. impos. to 10^h , and doubtless all night.
 24 Ov't and misty. Obs. impos. to 10^h , and doubtless all night.
 25 Clear. Moon begins to interfere. No A.B. to 10^h , but at times susp.
 26 Mostly ov't to 9^h , then cleared. Moon. No A.B. to $9\frac{1}{4}^h$.*
 27 Clear. Moon. A slight A.B. suspected about 6^h .*
 28 M'y ov't to 9^h ; bet'n 9^h and 10^h p'y cl'r in N.: no A.B. seen: moon.
 29 Almost wholly ov't. Obs. impos to $9\frac{1}{4}^h$ at least. [been seen.
 30 Cl'y and hazy: moon: no A.B. seen to 10^h : no mod. display c'd have

Oct. 14th.—Occasionally scarcely to be seen. About 8^h a bank about 1° to $1\frac{1}{2}^\circ$ high, through 50° horizontal extent. I saw no streamers, but did not watch long.

Nov. 26th.—Mr. H. F. thinks he saw the A.B. this evening; probably not.

Nov. 27th.—As none appeared after to $10^h 30^m$ it is quite uncertain.

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- Dec. 1 Ov't. Obs. impos. to 11^h, and probably all night.
 2 Clear. Moon. No A.B. to 11^h. Within most of evening.
 3 Clear. Moon. No A.B. to 9¹/₂^h.
 4 Mostly ov't. Moon. Obs. impos. to 10¹/₂^h.
 5 Clear. Moon. No A.B. seen to 10¹/₂^h.
 6 Ov't. Obs. impos. to 11^h, and doubtless all night.* [unc.
 7 Ov't to 11^h, then p'y cl'r but quite cl'y in N.: moon: no A.B.: obs.
 8 Ov't. Obs. impos. to 11^h, and probably all night.*
 9 Ov't. Obs. impos. to 10^h, and doubtless later. Clear at sunrise.
 10 M'y cl'r. No A.B. Moon rose about 8^h: aft. som't cl'y in N.*
 11 Mostly clear, but hazy. No A.B. to 9^h.
 12 M'y cl'r: sl't A.B. at 8^h; noticed 15^m; no streamers. [F. B.] (225)
 13 Clear. No A.B. to 9^h.
 14 Partly clear early part of ev'g: no A.B.: at 9¹/₂^h northern sky ov't.
 15 Ov't to 11¹/₂^h. [F. B.] E. C. H. at Greenwich: wh'y ov't all night.
 16 Ov't to 10^h. [F. B.] At Greenwich, wh'y ov't and raining to 9^h.
 17 Ov't to 9^h. [F. B.] At Greenwich, wh'y ov't and misty to 10^h.
 18 Ov't to 10¹/₂^h. [F. B.] At Greenwich, ov't to 8^h; at 9^h and after clear;
 19 Ov't. Obs. impos. to 10^h, and doubtless later. [no A.B. to 9¹/₄^h.
 20 Very clear. No A.B. to 9¹/₄^h.
 21 P'y cl'r early; no A.B. to 7^h: mostly ov't at 8¹/₂^h, and p. ov't all n't.
 22 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 23 Ov't; drizzling rain. Obs. impos. to 10^h, and doubtless all night.
 24 Ov't. Obs. impos. to 9¹/₂^h, and doubtless all night.
 25 Clear in N. early in ev'g: moon: no A.B.: from 8^h to 9^h ov't in N.
 26 Ov't, raining and snowing. Obs. impos. to 10^h, and d's all night.
 27 Clear at intervals during evening. Moon. No A.B. seen to 10^h.
 28 Ov't, with rain to 9^h. Obs. impos. to 9¹/₂^h, and doubtless much later.
 29 Very clear. Moon. No A.B. to 11^h. [A.B. seen.
 30 M'y cl'y to 7¹/₂^h; then cl'r to 10^h, except low cl'ds in N.: moon: no
 31 Clear. Moon. No A.B. seen to 10^h. In the house from 7^h to 10^h.

1844.

- Jan. 1 M'y cl'r; much of ev'g low cl'ds in N.: moon: no A.B. seen to 9¹/₄^h.
 2 Ov't. Obs. impos. to 9¹/₂^h, and doubtless all night.
 3 Ov't; cl'ds som't broken at 10^h. Obs. impos. to 10^h, and p. all night.
 4 Ov't. Obs. impos. to 10^h, and doubtless later.
 5 Clear. Moon. No A.B. seen to 10¹/₂^h.
 6 Clear. Moon. No A.B. seen to 10¹/₂^h.
 7 Clear early in ev'g and also after 10^h. No A.B. seen: obs. imperf.
 8 Clear. About 6¹/₄^h I suspected a slight auroral light low in north.*
 9 Ov't and snowing. Obs. impos. to 10¹/₂^h, and probably all night.
 10 Clear. No A.B. to 10^h.
 11 Clear. No A.B. to 10¹/₂^h.
 12 Ov't and raining. Obs. impos. to 11^h, and doubtless all night.
 13 Very clear. No A.B. to 10¹/₂^h.* (226)
 14 Mostly clear. No A.B. to 10^h.
 15 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 16 Ov't and raining. Obs. impos. to 10¹/₂^h, and doubtless all night.
 17 Clear most of evening. No A.B. to 10¹/₂^h.

Dec. 6th.—A.B. seen at Edinburgh. R. D. Paul, *Jameson's Edin. New Phil. Jour.*, April, 1844.

Dec. 8th.—Slight A.B. seen by M. Colla at Parma in Italy. *Lamont's Annalen*, 1843, p. 182.

Dec. 10th.—No A.B. seen to 9^h 15^m. Some suspicions of a slight A.B. about 8^h 30^m, but probably there was none.

Jan. 8th.—I saw no streamers, and am inclined to doubt whether it was the A.B. No A.B. seen after 10^h 15^m.

Jan. 13th.—Mr. F. Bradley thinks there was an A.B. about 9^h; no streamers.

1844.

- Jan. 18 Clear. No A.B. to 10^h.
 19 Clear. No A.B. to 10¹/₂^h.
 20 Clear. No A.B. to 10^h.
 21 Ov't and snowing. Obs. impos. to 10^h, and doubtless all night.
 22 Clear most of evening; hazy at 10^h. No A.B. to 10^h.
 23 Ov't early part of evening; clear at 9^h and after. No A.B. to 10¹/₂^h.
 24 Nearly clear.* (227)
 25 Cl'y in N. before 8^h; from 9^h sufficiently cl'r: moon: no A.B. to 10¹/₂^h.
 26 P'y cl'y in N. early in ev'g: moon: later clear. No A.B. to 10^h.
 27 Clear: moon: no A.B. cert. seen to 10^h, but som't susp. about 10^h.
 28 Thinly ov't. Obs. impos. to 9^h, and doubtless later.
 29 Clear. Moon. No A.B. seen to 10¹/₂^h.
 30 Ov't. Obs. impos. to 10^h, when the clouds began to break away.
 31 Clear. Moon. No A.B. seen to 10¹/₂^h.
- Feb. 1 Thinly ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 2 Ov't. Obs. impos. to 10¹/₂^h, and doubtless later.
 3 Clear. Moon. No A.B. seen to 10¹/₂^h.
 4 Clear generally; low cloud in N. Moon. No A.B. seen to 10^h.
 5 Ov't; sleet falling. Obs. impos. to 10³/₄^h, and doubtless all night.
 6 Mostly ov't. Obs. impos. to 10^h, and probably all night.
 7 Ov't to 10^h, d's later. [F. B.] E.C.H. at N.Y.: ov't: obs. imp. to 10^h.
 8 Cl'r at 10¹/₂^h; som't cl'y: no A.B. [F.B.] Cl'r at 7^h in N.Y.: no A.B.
 9 Clear: no A.B. to 10^h. [F. B.] Do. at N. Y. and Brooklyn.
 10 Mostly ov't to 8^h at least. At 10^h clear, and no A.B. to 10¹/₂^h.
 11 M'y cl'r. Some suspicion of A.B. about 10^h, but doubtful to 10¹/₄^h.
 12 Clear. No A.B. to 10³/₄^h.
 13 Ov't to 9^h; after that mostly clear, and no A.B. to 10¹/₂^h.
 14 Mostly clear. No A.B. to 10¹/₂^h.
 15 Ov't, and snowing after 8^h. Obs. impos. to 10¹/₂^h, and p. all night.
 16 Ov't. Obs. impos. to 11^h, and doubtless all night.
 17 Clear to 7¹/₂^h, and no A.B.: after, to 10^h at least, ov't.
 18 Clear. No A.B. to 10^h.
 19 Clear. No A.B. to 10¹/₄^h.
 20 Ov't until 9^h. Clear at 10^h. No A.B. to 10¹/₄^h.
 21 Clear. No A.B. to 8^h.
 22 Clear. No A.B. to 10^h.
 23 Cl'r to 7^h: no A.B.: aft. ov't, and obs. impos. to 10¹/₂^h, and d's all n't.
 24 Clear. Moon. No A.B. seen to 10^h.
 25 Clear. Moon. No A.B. seen to 10^h.
 26 Clear. Moon. No A.B. seen to 9¹/₂^h.
 27 Mostly ov't. Moon. Obs. nearly or quite impos. to 10¹/₂^h.
 28 Ov't to 7^h; partly clear after. Moon. No A.B. to 9^h. [F. B.]
 29 Ov't. Obs. impos. to 8¹/₂^h, and doubtless all night.
- Mar. 1 Mostly ov't. Obs. impos. to 10^h, and doubtless all night.*
 2 Ov't; rainy after 9¹/₂^h. Obs. impos. to 10^h, and doubtless later.
 3 Mostly ov't; raining at 10^h. Obs. impos. to 10^h, and d's all night.
 4 Clear: no A.B. seen to 10^h: some unusual l't in N. susp., prob. moon.
 5 Clear. Moon. No A.B. seen to 11^h.

Jan. 24th.—A.B. seen from 10^h and after, suspected between 9^h and 10^h, but as the moon was up, I could not decide. Moon set about 10^h 20^m; from 10^h to 10^h 30^m I watched; distinct light of about 40° horizontal extent; 2° or 3° alt. with occasional spots or indistinct streamers, shifting westwardly. I looked after 11^h and found several bright streamers, one 8° or 10° high, besides a low, clear light. Dr. J. G. Percival informs me that he saw several distinct streamers between 11^h and 12^h.

March 1st.—According to the *U. S. Gazette* there "was a beautiful display of the aurora" this evening. From the statement I have little doubt that this refers to the radiations in the W. and N.W. seen soon after sunset.

1844.

- Mar. 6 | Mostly ov't. Obs. impos. to 9^h at least.
 7 | Clear. Moon rose about 10^h. No A.B. seen to 11^h.
 8 | Ov't and rain. Obs. impos. to 10³/₄^h, and doubtless all night.
 9 | P'y cl'r to 8^h: no A.B. [8^h to 9^h cl'r: no A.B.: cl'y at 12^h. (F. B.)]
 10 | Very clear. No A.B. to 10^h.
 11 | Clear. No A.B. to 10¹/₄^h.
 12 | Ov't; little rain. Obs. impos. to 10^h, and doubtless all night.
 13 | Ov't; misty. Obs. impos. to 10^h, and doubtless later.
 14 | Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 15 | Ov't. Obs. impos. to 9^h, and doubtless all night.
 16 | Ov't and rainy. No obs. pos. to 10¹/₂^h; rainy all night.
 17 | Clear. No A.B. to 10^h.
 18 | Mostly ov't early in ev'g, and obs. impos.: at 11^h n'y cl'r: no A.B.
 19 | Clear. No A.B. to 9^h. [in part, and no A.B.
 20 | M'y ov't, and obs. n'y impos. to 11^h; p. all n't: before 10^h oc'y clear
 21 | Ov't and snowing. Obs. impos. to 11^h, and doubtless all night.
 22 | Clear. Moon begins to interfere. No A.B. seen to 9³/₄^h.
 23 | Clear. Moon. No A.B. seen to 10^h.
 24 | Mostly clear. Moon. No A.B. seen to 9^h.
 25 | Clear. Moon. No A.B. seen to 10¹/₄^h.
 26 | Mostly ov't; wholly so after 9^h. No A.B. seen. Moon.
 27 | Ov't. Obs. impos. to 9¹/₂^h, and doubtless all night.
 28 | Ov't and rainy. Obs. impos. to 11^h, and probably much later.
 29 | Ov't; raining after 10^h. Obs. impos. to 10^h, and d's all night.
 30 | Ov't; sleet falling. Obs. impos. to 10^h, and doubtless all night.
 31 | Clear. Moon. No A.B. seen to 10^h.
 April 1 | Clear. Moon. No A.B. seen to 10¹/₂^h.
 2 | Clear. Moon. No A.B. seen to 10^h.
 3 | Clear. Moon. No A.B. seen to 9¹/₂^h.
 4 | Mostly ov't. Obs. impos. to 10^h, and doubtless later.
 5 | Clear. A slight A.B. between 9^h and 9³/₄^h.* (228)
 6 | Ov't; a little rain. Obs. impos. to 10^h, and doubtless all night.
 7 | Ov't. Obs. impos. to 10^h, and doubtless all night. [seen to 10^h.
 8 | Cloudy in part and hazy: a faint A.B. c'd not have been seen: none
 9 | Clear. No A.B. to 11¹/₂^h. [F. B.]
 10 | Clear. No A.B. to 9¹/₄^h.
 11 | Al't entirely ov't: obs. impos. to 11^h at least; then cl'r space in east.
 12 | Clear. No A.B. to 9¹/₂^h.
 13 | Clear. No A.B. to 9¹/₂^h.
 14 | Mostly clear, but hazy about horizon. No A.B. to 10^h.
 15 | Ov't. Obs. impos. to 10¹/₂^h at least.
 16 | Ov't. Obs. impos. to 11^h at least.
 17 | Partly clear. Long narrow clouds about the north.*
 18 | Very clear. No A.B. to 10^h.
 19 | Half cl'y. No A.B. to 8¹/₂^h. Later quite cl'y, and after midn't ov't.
 20 | Ov't. Obs. impos. to 10^h, and d's all n't. Misty at sunrise of 21st.
 21 | Ov't. Obs. impos. to 10^h, and doubtless all night.
 22 | Cl'r to 8^h; no A.B.: moon: within from 8^h to 11^h; at 11^h wh'y ov't.
 23 | M'y cl'r to 8^h: moon: no A.B. seen: within from 7³/₄^h to 9¹/₄^h; then
 24 | Wholly ov't. Obs. impos. to 10¹/₂^h, and d's later.* [wh'y ov't.

April 5th.—A faint illumination, about 20° horizontal extent, and 1° to 2° in altitude; no streamers seen. Although very dim, I consider the light auroral.

April 17th.—No A.B. to 10^h 30m, although, as usual, the clear spaces between the clouds seemed more luminous than natural.

April 24th.—About 10^h 30m it seemed as if there was unusual light behind the clouds in the north; but the clouds may there have been less dense. Moon.

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- Apr. 25 Quite hazy and m'y ov't in N.: moon: obs. n'y or quite impos. to $9\frac{1}{4}$ h.
 26 Ov't. Obs. impos. to 11^h , and doubtless later.
 27 Ov't. Obs. impos. to $10\frac{1}{2}$ h, and doubtless later.
 28 Very clear. Moon. No A.B. seen to 10^h .
 29 Nearly clear. Moon. No A.B. seen to $9\frac{1}{2}$ h.
 30 Ov't but not densely, to 9^h . Moon. Obs. impos. to 9^h at least.
- May 1 Mostly ov't, and hazy in open spots. Moon. Obs. impos. to 9^h .
 2 Much ov't. Moon. Obs. impos. to 10^h at least. [A.B.: moon.
 3 M'y ov't. Obs. impos. to 11^h , except about 9^h , when there was no
 4 M'y cl'r: l'tning in N.: no A.B. seen to 10^h , but obs. nec'y imperf.
 5 M'y cl'r to 9^h , and no A.B.; after that too cl'y for obs. to 10^h at least.
 6 Ov't, showery. Obs. impos. to $10\frac{1}{2}$ h. Clear after 11^h , I am told.
 7 Very clear. No A.B. to 10^h .
 8 M'y ov't in N.; cl'ds broken: obs. n'y impos. to 9^h : none seen.*
 9 Clear. No A.B. to 10^h .
 10 Ov't. Obs. impos. to 11^h , and doubtless all night.
 11 Mostly ov't. Obs. impos. to 11^h at least.
 12 Very clear: violent N.W. wind p.m. and ev'g. No A.B. to $9\frac{1}{2}$ h.
 13 Ov't. Obs. impos. to 11^h , and doubtless all night.
 14 Ov't for the most part, and hazy after 9^h : no A.B. seen to 10^h .*
 15 P'y cl'r to 10^h ; no A.B. seen, but obs. embarrassed: aft. 10^h ov't to
 16 Ov't to 12^h , and probably all night. Obs. impos. [11^h at least.
 17 Ov't: obs. n'y impos. to $10\frac{1}{2}$ h: at $10\frac{1}{2}$ h broken cl'ds: no signs of A.B.
 18 Partly clear to 9^h , and no A.B. Obs. imperfect. After 9^h ov't.
 19 Ov't. Obs. impos. to 10^h , and doubtless all night.
 20 Ov't and misty. Obs. impos. to 10^h , and doubtless all night.
 21 Mostly clear; very clear at 10^h : moon interf.: no A.B. seen to 10^h .
 22 Clear. Moon. No A.B. at 10^h .* (229)
 23 Clear. Moon. No A.B. seen to 10^h . Within from 8^h to 10^h .
 24 Clear. Moon. No A.B. seen to 11^h . Within most of the evening.
 25 Ov't in N.; cl'ds broken elsewhere: obs. impos. to 10^h at least.
 26 Ov't; shower about 9^h . Obs. impos. to 10^h at least.
 27 Very hazy. Obs. impos. to 11^h , and probably all night.
 28 Mostly ov't about the N. especially. Moon. Obs. impos. to 10^h .
 29 M'y cl'r; hazy: moon: no A.B. seen to 11^h ; none at 11^h .
 30 Ov't; heavy showers. Obs. impos. to 10^h , and doubtless all night.
 31 Ov't. Obs. impos. to 10^h , and doubtless later.
- June 1 Clear. Moon rose about 9^h . No A.B. seen to $10\frac{1}{2}$ h.
 2 Ov't; showery. Obs. impos. to 10^h , and doubtless later.
 3 Hazy. No A.B. to 10^h . A faint light could not have been seen.
 4 Clear. No A.B. to $10\frac{1}{4}$ h.
 5 Mostly ov't. Within from 8^h to $10\frac{1}{2}$ h. No A.B. seen: obs. imperf.
 6 Cl'r: no A.B. to 10^h : within most of ev'g: at 11^h m'y ov't about N.
 7 Mostly ov't and showery. Obs. impos. to 11^h , and prob. all night.
 8 Much clouded. No A.B. discernible to 10^h , but obs. imperfect.
 9 Ov't; thunder shower about 10^h : obs. impos. to 10^h , and d's later.
 10 Partly cloudy. No A.B. noticed to $10\frac{1}{2}$ h.
 11 Very clear. No A.B. to 11^h .
 12 Clear. No A.B. to 10^h .

May 8th.—At Manlius, N. Y., Mr. William Smith saw a faint auroral light at 10^h ; saw no streamers.

May 14th.—Observation nearly impossible. At Manlius, N. Y., Mr. William Smith saw the A.B. from $9^h 20^m$ to $10^h 20^m$; two arches, and several streamers, some quite bright.

May 22d.—A considerable display of A.B. from $8^h 45^m$ to 9^h ; a bank, horizontal extent about 20° , and some fine streamers, 10° high. [F. B.]

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- June 13 Ov't. Obs. impos. to 10^h, and doubtless later.
 14 Ov't principally before 9^h. At 11^h clear, and no A.B.
 15 Clear. No A.B. to 10¹/₂^h.
 16 Beautifully clear. No A.B. to 10^h.
 17 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 18 Clear. No A.B. to midnight.
 19 Ov't. Obs. impos. to 10^h.
 20 Mostly clear. No A.B. from 10^h to 11^h. Within earlier.
 21 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 22 Cloudy to 9^h; cleared between 9^h and 10^h. Moon interferes.*
 23 Mostly clear. Moon. No A.B. seen to 10^h.
 24 Ov't. Obs. impos. to 10³/₄^h, and probably later.
 25 Mostly ov't in N.: moon: obs. nearly impos. to 10¹/₄^h at least.
 26 Much cl'ded early in ev'g: moon: quite cl'r from 10^h to 12^h: no A.B.
 27 Scattered clouds. Moon. No A.B. seen to 10^h, but obs. imperfect.
 28 Clear. Moon. No A.B. seen to 10¹/₂^h.
 29 Clear. Moon. No A.B. seen to 10³/₄^h.
 30 Som't cl'ded, but sufficiently cl'r in N.: moon: no A.B. seen to 10^h.
 July 1 Mostly ov't. Moon. Obs. impos. to 10¹/₄^h.
 2 Mostly ov't. Moon. Obs. impos. to 10^h, and prob. all night.
 3 Clear. No A.B. to 10^h; none at 2^h A.M. of 4th; the moon then up.
 4 Much cl'ded in N.; no A.B. susp.: obs. nearly impos. to 10¹/₂^h at least.
 5 Ov't. Obs. impos. to 10¹/₄^h, and d's all night. [obs. imperfect.
 6 M'y cl'r: long cloud in N. and E., and p'tning: no A.B. seen to 10¹/₄^h;
 7 Very clear. No A.B. to 10¹/₄^h.
 8 Clear. No A.B. to 10¹/₄^h.
 9 Mostly ov't, especially in N.: obs. impos. to 10¹/₄, and p. all night.
 10 Ov't; thunder shower after 9^h: obs. impos. to 10^h, and d's later.
 11 Mostly ov't. Obs. nearly or quite impos. to 10^h and later.
 12 M'y ov't in N. after 8¹/₂^h: obs. nearly or quite impos. to 10^h at least.
 13 M'y ov't to 10^h, obs. impos.: aft. 10^h p'y cl'r: no A.B. seen to 10³/₄^h.
 14 M'y ov't to 9¹/₂^h; at 10^h cl'r above alt. of 25°: no A.B. seen to 10¹/₄^h.
 15 Ov't. Obs. impos. to 10¹/₂^h, and d's all night. [A.B. seen to 10¹/₄^h.
 16 Ov't to between 9^h and 10^h; then tolerably cl'r except low in N.; no
 17 M'y ov't to 11^h: no A.B. seen, but obs. imperfect: very cl'r in morn.
 18 Clear. No A.B. to 10¹/₂^h.
 19 Rain; cleared at 9¹/₄^h: tolerably clear in N. at 9¹/₂^h, and no A.B.
 20 Clear. No A.B. to 10¹/₂^h.
 21 Clear. Moon. No A.B. seen to 9¹/₂^h.
 22 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 23 Ov't. Obs. impos. to 10¹/₄^h, and doubtless later.
 24 Mostly ov't. Obs. impos. to 9¹/₂^h, and probably all night.
 25 Ov't. Obs. impos. to 9¹/₂^h, and doubtless all night.
 26 Clear. Moon. No A.B. seen to 9¹/₂^h.
 27 Clear. Moon. No A.B. seen to 10¹/₄^h.
 28 Clear. Moon. No A.B. seen to 9¹/₂^h.
 29 Ov't. Obs. impos. to 10¹/₄^h, and doubtless all night.
 30 Thinly ov't. Moon. Obs. impos. to 10^h, and probably all night.
 31 Ov't and rainy. Obs. impos. to 10¹/₂^h, and doubtless all night.
 Aug. 1 Too cloudy about the N. for obs. to 9^h, and probably all night.
 2 Ov't to 10^h, and doubtless all night. Obs. impos.
 3 Almost wholly ov't. Obs. impos. to 10^h, and probably all night.

June 22d.—No A.B. seen to 10^h 15^m, but some unusual light suspected, yet very doubtful.

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- Aug. 4 Beautifully clear. No A.B. to 10^h.
 5 Beautifully clear. No A.B. to 10¹/₂^h.
 6 Mostly ov't; clear openings occasionally. No A.B. seen to 10¹/₂^h.
 7 Tolerably clear, but hazy about the N. No A.B. seen to 10¹/₂^h.
 8 Nearly clear. No A.B. to 10^h.
 9 Mostly ov't to 11^h. Obs. nearly impos. [A.B. at Nantucket.]
 10 Ov't. Obs. impos. to 10^h; cleared up during the night.
 11 Clear. A slight A.B. seen.* (230)
 12 Clear. No A.B. seen to 11^h, but within doors most of the time.
 13 Ov't. Obs. impos. to 11^h, and doubtless later.
 14 Mostly clear. No A.B. to 11^h. Within most of the time.
 15 Mostly ov't. Obs. impos. to midnight.
 16 Mostly clear. No A.B. to 9^h.
 17 Clear. No A.B. to 10^h.
 18 Clear, but hazy about horizon. No A.B. to 9¹/₂^h.
 19 Ov't. Obs. impos. to 10¹/₂^h, and probably all night.
 20 M'y ov't: moon interferes: obs. n'y impos. to 10¹/₄^h: no A.B. seen.
 21 Mostly clear. Moon. No A.B. seen to 11^h. Within most of time.
 22 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 23 Cl'r, except clouds in N.: shower about 8^h: moon: no A.B. seen to
 24 Mostly ov't: moon: obs. impos. to 10¹/₂^h. [11^h: obs. imperf.
 25 Ov't. Obs. impos. to 10^h at least.
 26 Mostly ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 27 M'y ov't, especially in N.: moon: obs. impos. to 10¹/₄^h, and p. all n't.
 28 Ov't. Thunder shower between 9^h and 10. Obs. impos. to 10¹/₂^h.
 29 Clear in part. Moon. No A.B. seen to 10¹/₂^h, but cl'ds impair obs.*
 30 Mostly clear. Moon. A.B. suspected towards 9^h.
 31 Ov't. Obs. impos. to 10^h, and probably later.
 Sept. 1 Ov't. Obs. impos. to 10^h; clouds then breaking up.
 2 Ov't; some rain d'g night: obs. impos. to 10¹/₄^h, and d's much later.
 3 Clear. No A.B. to 10¹/₂^h.
 4 Clear. No A.B. to 10¹/₂^h.
 5 Clear. No A.B. to 10¹/₂^h.
 6 Clear. No A.B. to 10¹/₂^h.
 7 Clear. No A.B. to 10¹/₄^h.
 8 Clear. No A.B. to 10^h. [F. B.] Could not myself observe.
 9 Clear early in evening; mostly ov't at 10^h. No A.B. to 10^h.
 10 Clear, but hazy about horizon. No A.B. to 8¹/₄^h.
 11 Mostly ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 12 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 13 Mostly ov't. No A.B. seen to 11^h, but obs. necessarily imperfect.
 14 Nearly clear, but hazy about horizon. No A.B. seen to 11^h.
 15 Very clear. No A.B. to 10^h.
 16 Clear. No A.B. to 10¹/₂^h.
 17 Clear. No A.B. to 10¹/₂^h.
 18 Clear. Moon interferes. No A.B. seen to 10¹/₂^h.
 19 Clear. Moon. No A.B. seen to 10¹/₂^h.
 20 Clear. Moon. No A.B. seen to 11^h.

Aug. 11th.—At 9^h 50m, five or six streamers in N. horizon, extending about 4° high, disappeared in about five minutes. At 10^h 50m, a single streamer visible about five minutes. No other auroral signs during the night.

Aug. 29th.—At Homer, Cortland Co., N. Y., A.B. seen; first noticed about 9^h 40m; an arch or bank, wide and bright, 75° to 90° chord; then streamers 20° to 40° high. At 10^h dense fog and clouds. Communicated by Mr. E. D. Selden. A.B. said to have been seen at Cambridge, Mass.

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- Sept. 21 Mostly ov't. Obs. impos. to $10\frac{1}{2}^h$.
 22 Clear. Moon. No A.B. seen to 10^h .
 23 Clear. Moon. No A.B. seen to 10^h .
 24 Mostly ov't. Obs. impos. to 11^h , and probably all night.
 25 Ov't and rainy. Obs. impos. to $11\frac{1}{4}^h$, and doubtless all night.
 26 Clear. Moon. No A.B. seen to 9^h . [most of ev'g.
 27 M'y cl'r: ov't thinly from 8^h to 10^h : moon: no A.B. to 11^h : within
 28 Ov't and rainy. Obs. impos. to 10^h , and doubtless all night.
 29 Clouds breaking away, but too cloudy for obs. to $9\frac{1}{2}^h$.
 30 Mostly clear after 9^h . Moon. No A.B. seen to $10\frac{3}{4}^h$.*
- Oct. 1 Clear. Moon in part. No A.B. seen to $10\frac{1}{2}^h$.
 2 Mostly clear. No A.B. to $9\frac{1}{2}^h$.
 3 Ov't and rainy. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 4 Mostly clear. No A.B. to $10\frac{1}{2}^h$.
 5 Mostly clear. No A.B. to 10^h .
 6 Ov't. Obs. impos. to 9^h , and d's all night. Rain during the night.
 7 Mostly clear. No A.B. to $10\frac{1}{4}^h$.
 8 Clear. No A.B. to 10^h .
 9 Cloudless, but very hazy toward horizon. No A.B. to $10\frac{1}{2}^h$.
 10 Mostly clear. No A.B. to $10\frac{1}{4}^h$.
 11 Clear. No A.B. to 10^h .
 12 Very clear. No A.B. to $10\frac{1}{4}^h$.
 13 Ov't. Obs. impos. to 10^h , and doubtless all night.
 14 Ov't and rainy. Obs. impos. to 11^h , and doubtless all night.
 15 P'y cl'r, but hazy, to 10^h , then ov't: obs. unc.: no A.B. seen or susp.
 16 Nearly cl'ss; hazy about hor.: no A.B. seen to $10\frac{1}{2}^h$: obs. imperfect.
 17 Ov't. Obs. impos. to 10^h , and doubtless all night.
 18 Ov't and rainy. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night.
 19 Clear. Moon. No A.B. seen to $10\frac{1}{4}^h$.
 20 Mostly clear. Moon.* (231)
 21 Ov't and rainy. Obs. impos. to 11^h , and doubtless all night.
 22 Clear. Moon. No A.B. seen to 11^h .
 23 Clear. Moon. No A.B. seen to 11^h .
 24 Mostly ov't in N. Obs. nearly or quite impos. to $10\frac{1}{2}^h$.
 25 M'y cl'r, but patches of clouds in N.: moon: no A.B. seen to $10\frac{1}{2}^h$.
 26 M'y cl'r; haze; cirrous streaks in N.: moon: no A.B. seen to $10\frac{1}{2}^h$.
 27 Ov't. Obs. impos. to 9^h , and probably all night.
 28 Ov't and drizzling. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night.
 29 Ov't to 10^h ; at $10\frac{1}{2}^h$ m'y cl'r; low cl'ds in N. and E.: moon: no A.B.
 30 Ov't. Obs. impos. to 9^h , and probably all night.
 31 Clear. No A.B. to $10\frac{1}{2}^h$. Moon rose about 9^h .
- Nov. 1 Clear. No A.B. to 10^h .
 2 Clear, but hazy about horizon. No A.B. seen to $10\frac{1}{2}^h$.
 3 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 4 Ov't and rainy. Obs. impos. to $9\frac{1}{4}^h$, and doubtless all night.
 5 Mostly clear. A.B. slightly suspected at $9\frac{1}{4}^h$. [F. B.]*
 6 Clear: slight A.B. at $8\frac{1}{2}^h$, and at 12^h : no streamers. [F. B.]* (232)

Sept. 30th.—Some unusual light in north suspected between 10^h and 11^h .

Oct. 20th.—Suspected some auroral light towards 9^h ; saw no streamers; may have been only haze illumined by the moon. Retired at 9^h . [A very considerable A.B. about midnight, and as early as 10^h 30m. A fine arch and numerous dancing streamers. See *New Haven Morning Courier*, Oct. 24th.]

Nov. 5th.—E. C. H. at Hartford. Clear: no A.B. to 10^h 30m. Between 8^h and 9^h saw sundry flashes low in the south.

Nov. 6th.—E. C. H. at New Britain. Mostly clear, but clouds about N. No A.B. surely seen to 8^h , yet suspected. Persons abroad later report a slight A.B.

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- Nov. 7 Clear. No A.B. to 8^h. [quite clear: no A.B.]
 8 Clear to 7^h: no A.B.: aft. 8^h sky much obsc. to 10^h: from 10^h to 11^h
 9 Mostly clear, but hazy about N. No A.B. to 10^h.
 10 Ov't. Obs. impos. to 9¹/₂^h: clear from 10^h to 11^h; flashes in S.W.
 11 Ov't chiefly to 9^h; from 9^h to 10^h cl'ss but misty: no A.B. seen to 10^h.
 12 Ov't; rainy to 11¹/₂^h, p. all n't. [F. B.] E.C.H. on Hudson river; ov't.
 13 Ov't to 9^h, except clear streak in N. Cleared at 9¹/₄^h.
 14 Very clear. No A.B. to 9¹/₂^h. [F. B.] Moon to 8¹/₂^h.
 15 Clear. No A.B. to 11^h; at 11^h somewhat cloudy in N. [F. B.]*
 16 Considerably clouded. A.B. seen from about 7¹/₂^h to 10^h.* (233)
 17 Ov't. Obs. impos. to 10^h, and doubtless all night. Rainy night.
 18 Cl'ed off about 8^h: moon: no A.B. at 9^h and none at 11¹/₂^h. [F. B.]
 19 Clear. Moon. No A.B. to 9^h. [F. B.]
 20 Much clouded. Moon. No A.B. to 11^h. [F. B.]
 21 Ov't to 11^h, and doubtless all night. [F. B.]
 22 Ov't to 10^h, and doubtless later. [F. B.]
 23 Mostly clear in N. Moon. No A.B. seen to 10^h.
 24 Clear. No A.B. seen to 10^h. Within doors from 7^h to 9^h.
 25 Clear. Moon. No A.B. seen to 10¹/₂^h.
 26 Ov't; sleet early in ev'g. Obs. impos. to 10¹/₂^h, and doubtless later.
 27 Mostly ov't; wholly so in N. Obs. impos. to 11^h, and d's later.
 28 Ov't and snowing. Obs. impos. to 10¹/₂^h, and doubtless all night.
 29 Clear. No A.B. to 10^h.
 30 Ov't to 10¹/₂^h, and doubtless all night.
 Dec. 1 Ov't early part of evening. Clear at 9^h. No A.B. to 10^h.
 2 Clear. No A.B. to 10³/₄^h.
 3 Ov't to 10¹/₂^h, and doubtless all night. Obs. impos.
 4 Ov't. Obs. impos. to 11^h, and doubtless all night.
 5 Ov't. Obs. impos. to 11^h, and doubtless all night.
 6 Ov't. Obs. impos. to 11^h, and doubtless all night.
 7 Ov't early part of evening. Cleared about 8¹/₂^h. No A.B. to 10¹/₂^h.
 8 Very clear. No A.B. to 9¹/₂^h.
 9 Tolerably clear to 10^h; four-fifths ov't at 10³/₄^h. No A.B. to 10¹/₂^h.
 10 Clear. No A.B. to 11^h.
 11 Snowing from 5^h until after 10^h: obs. impos. to 10^h, and d's all n't.
 12 Clear. No A.B. to 11^h.
 13 Ov't to 9^h: within 9^h to 10^h: cl'ring bet'n 10^h and 11^h: no A.B. seen.
 14 Mostly clear. Within from 6¹/₂^h to 9^h.* (234)
 15 Ov't early; at 9^h n'y cl'r except in N.; at 10¹/₂^h cl'r: moon: no A.B.
 16 Ov't. Obs. impos. to 10¹/₂^h, and probably later.
 17 M'y cl'r except in N.: obs. n'y impos. to 10¹/₂^h: cl'r at 12^h: no A.B.
 18 Ov't. Obs. impos. to 11^h, and probably all night.
 19 Ov't. Obs. impos. to 10^h, and doubtless later.
 20 Nearly clear. Moon. No A.B. to 11^h.
 21 Ov't. Obs. impos. to 11^h, and probably all night.
 22 Ov't, drizzle. Obs. impos. to 9³/₄^h, and doubtless all night.
 23 Rain and snow, with violent wind: obs. impos. to 11^h, and d's later.
 24 Cl'y in N. to 7^h, and from 9^h to 10¹/₄^h: within 7^h to 9^h: obs. n'y impos.

Nov. 13th.—No A.B. to 9h 30m; suspected at 11h 30m. [F. B.] E. C. H. at Albany. Mostly clear, and no A.B. to 10h.

Nov. 15th.—E. C. H. at New York. Clear; suspected A.B. about 9h, but very doubtful.

Nov. 16th.—Numerous streamers, generally not above 10h, dancing more or less; obscured by clouds. E. C. H. coming up Long Island Sound.

Dec. 14th.—From 9h to 10h 30m saw the A.B.; about 70° horizontal extent illumined about 3° or 4° high. I saw no streamers, but could not watch many minutes at a time. Moon begins to interfere.

1844.

- Dec. 25 Partly clear: moon: too cloudy about N. for obs. to 10 $\frac{1}{2}$ ^h.
 26 M'y cl'r to 7^h; cl'y to 10^h; p'y cl'r bet'n 10^h and 11^h; ov't at 11^h: no
 27 Ov't and snowing. Obs. impos. to 9^h, and p. all n't. [A.B.: moon.
 28 Clear. No A.B. to 10^h.
 29 Clear. A.B. visible all the evening.* (235)
 30 Mostly clear. No A.B. to 10 $\frac{1}{2}$ ^h.
 31 Clear to 10^h, and no A.B. At 10 $\frac{1}{2}$ ^h, wholly ov't.

1845.

- Jan. 1 Mostly clear, but hazy at times. No A.B. to 11^h.
 2 Very clear. No A.B. to 10 $\frac{1}{4}$ ^h.
 3 Ov't; raining at 10^h and after. Obs. impos. to 11^h.
 4 Very hazy. Obs. impos. to 10^h.
 5 Almost wholly ov't to 10^h. Obs. impos.
 6 Ov't and snowing. Obs. impos. to 1^h A. M. [F. B.]
 7 Clear. No A.B. to 10^h. [F. B.]
 8 Clear in N. Y. No A.B. to 10^h.
 9 Partly clear. Bright A.B. seen as early as 6 $\frac{1}{4}$ ^h*. (236)
 10 Clear. No A.B. at 6 $\frac{1}{2}$ ^h, 7 $\frac{1}{2}$ ^h, 8, 9 $\frac{1}{2}$ ^h. [F. B.]
 11 Cl'r: no A.B. at 7^h, 8 $\frac{1}{2}$ ^h, 10 $\frac{1}{4}$ ^h: hazy. [F. B.] Cl'r 10^h to 11^h: no A.B.
 12 M'y ov't; at 9 $\frac{1}{2}$ ^h p'y cl'r: about 10^h A.B. sl'tly susp.: low cl'd in N.
 13 Ov't. Obs. impos. to 11^h at least.
 14 Clear. Moon. No A.B. to 10 $\frac{1}{2}$ ^h.
 15 Ov't to 10^h, and probably all night. Obs. impos.
 16 Ov't, drizzle. Obs. impos. to 11^h, and doubtless all night.
 17 Ov't; rainy. Obs. impos. to 11^h, and doubtless all night.
 18 Clear. Moon. No A.B. to 10 $\frac{1}{2}$ ^h.
 19 Ov't. Moon faintly shining part of ev'g. Obs. impos. to 10^h.
 20 Ov't to 10^h, and doubtless all night.
 21 Partly clear. Moon. Obs. nearly or quite impos. to 10^h.
 22 Clear. Moon. No A.B. to 8^h, or at 1^h A. M. of 23d. Obs. imperfect.
 23 Clear. Moon. No A.B. to 8^h, or at 1^h A. M. of 24th.
 24 Ov't and very stormy. Obs. impos. to 9^h, and doubtless all night.
 25 Ov't to 9^h at least. Obs. impos.
 26 Very clear. A.B. slightly suspected.*
 27 Mostly clear. No A.B. to 9^h. Clouding up in N. at 9^h.
 28 M'y cl'r in N. to 8^h: no A.B.: after 8^h ov't to 9^h, and d's all night.
 29 Partly clear, but some clouds about N. No A.B. seen to 9^h.* (237)
 30 Clear. No A.B. to 10^h.
 31 Clear. No A.B. to 10^h.
 Feb. 1 Clear. No A.B. to 9 $\frac{1}{2}$ ^h.
 2 Mostly clear. No A.B. to 9 $\frac{1}{2}$ ^h.
 3 Ov't to 9^h, and doubtless all night. Obs. impos.
 4 Snowing all night, with strong wind. Obs. impos.
 5 Ov't early; cleared about 7^h, but quite hazy to 10^h: no A.B. to 10^h.
 6 Tolerably clear to 9^h. No A.B. Then ov't to 10 $\frac{1}{2}$ ^h at least.
 7 Clear. No A.B. to 10 $\frac{1}{2}$ ^h.
 8 Hazy to 8^h; after that tolerably clear in N. No A.B. to 10 $\frac{1}{2}$ ^h.

Dec. 29th.—Being within, did not see it until 9^h; there were then small strips of clouds in the N. Much general cloudiness before. Horizontal extent 80°, and 5° high. I saw no streamers up to 10^h. [General light from 6^h 30m. (F. B.)]

Jan. 9th.—Horizontal extent 90°; streamers 30° or 40° high; somewhat obscured by clouds. Later very much concealed by clouds. [F. B.] E. C. H. in New York City from 6th to 11th. There, Jan. 9th, it was mostly clear; considerable A.B. all the evening. After midnight, clearer; a distinct arch, perhaps 80° horizontal extent; no streamers seen.

Jan. 26th.—Moon rose at 8^h 30m. No A.B. surely seen to 9^h.

Jan. 29th.—[At 10^h clear, and think there was an A.B. Saw no streamers in five minutes. F. B.]

1845.

- Feb. 9 M'y cl'r, but somewhat hazy to 8^h; after that cl'r: no A.B. to 9¹/₂^h.
 10 Hazy to 7^h; ov't to 11^h at least: obs. impos. to 11^h, and d's all night.
 11 Wholly ov't to 11^h at least, and doubtless all night. Obs. impos.
 12 Clear. Moon. No A.B. to 10¹/₄^h.
 13 Most of evening more or less haze and cloudiness. Moon.*
 14 Ov't; rain and sleet. Obs. impos. to 10¹/₂^h, and doubtless all night.
 15 Ov't, drizzle, to 10^h and later. Obs. impos. to 10¹/₂^h, and d's all night.
 16 Ov't early in ev'g: at 9^h and after m'y cl'r: moon: no A.B. seen.
 17 Ov't. Obs. impos. to 10¹/₂^h, and probably later. [imperfect.
 18 M'y cl'r to 7¹/₂^h: moon: sky obstructed to 10¹/₂^h: no A.B. seen: obs.
 19 Much obs. by haze and cl'ds: moon: obs n'y or quite impos. to 10¹/₂^h.
 20 Too hazy and cloudy for obs. to 10¹/₂^h, and probably all night.
 21 Very foggy. Obs. impos. to 10¹/₂^h, and probably later.
 22 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 23 Ov't and rainy. Obs. impos. to 10^h, and doubtless later.
 24 Very cl'r: moon rose at 8¹/₄^h: no A.B. to 8^h, and none seen aft. to 10¹/₂^h.
 25 Clear. A.B. seen between 8^h and 9^h.* (238)
 26 Clear after about 7¹/₂^h. No A.B. to 10¹/₂^h.
 27 Ov't: larger stars in zenith vis.: obs. impos. to 10^h, and d's later.
 28 Clear. No A.B. to 10¹/₂^h.
 March 1 Clear, but slightly hazy. No A.B. to 10¹/₂^h.
 2 Ov't. Obs. impos. to 10^h, and doubtless all night.
 3 Very clear. No A.B. to 11^h.
 4 Ov't. Obs. impos. to 11¹/₂^h, and doubtless all night.
 5 Mostly ov't, and obs. impos. to 10^h at least; at 11¹/₂^h clear: no A.B.
 6 Clear. No A.B. to 10^h.
 7 Hazy most of ev'g; at 10^h ov't: no A.B. seen to 9¹/₂^h, nor at 10¹/₂^h.
 8 Hazy fore part of evening; clear after 8^h. No A.B. to 10^h.
 9 Within from 7^h to 9^h: mostly clear from 9^h to 10^h.*
 10 Ov't and snowing. Obs. impos. to 11^h, and doubtless all night.
 11 Mostly clear to 9¹/₂^h. Moon. Ov't to 10^h and after to 11^h.
 12 Nearly clear. Moon. No A.B. to 10^h.
 13 Nearly ov't. Obs. impos. to 10^h, and at 11¹/₂^h, and d's all night.
 14 Ov't, rain. Obs. impos. to 10^h.
 15 Too much clouded for obs. to 10^h, and prob. most of the night.
 16 Tolerably clear; flying clouds here and there. Moon.*
 17 Sky obs., cl'ds and haze: moon: obs. imperf.: no A.B. seen to 10¹/₂^h.
 18 Mostly ov't early part of ev'g; cleared up about 8^h.*
 19 N. obs. below 10°, often as high as 50°, to 10¹/₂^h: obs. n'y impos.
 20 Partly clear. N. too much clouded for obs. to 10^h at least.
 21 Very clear. Moon. No A.B. to 10¹/₂^h.
 22 Very clear. Moon. No A.B. to 10^h.
 23 Ov't; rain about 9^h. Obs. impos. to 9¹/₄^h, and prob. all night.
 24 Ov't, al't wh'y: some clear spaces about 10^h: obs. impos. to 11^h.
 25 Clear. Moon rose at 8³/₄^h. No A.B. to 10^h.
 26 Ov't, almost entirely. Obs. impos. to 10^h, and prob. all night.

Feb. 13th.—No A.B. surely seen to 10^h 30m; but about 8^h A.B. slightly suspected; very doubtful.

Feb. 25th.—Arc 20° horizontal extent, and numerous streamers 20° high, some very bright at base. Moon rose at 9^h 45m. A.B. nearly extinct about 9^h 15m.

March 9th.—Clouds hanging about N. Some faint light suspected, but probably due to contrast with clouds, to 10^h.

March 16th.—Occasionally the north seemed lighter than usual, but it is probably due to haze and clouds illumined by the moon.

March 18th.—Some cloudiness low in the north to 10^h at least. Moon. Quite light in north, due probably to moonlight on the clouds. Overcast, in N. at least, at 11^h.

1845.

- Mar. 27 Hazy. No A.B. to $10\frac{1}{2}^h$, but a faint display w'd not have been vis.
 28 Very hazy. Polaris faintly vis.: no A.B. seen to 10^h : obs. imperf.
 29 Ov't. Obs. impos. to 11^h , and doubtless all night.
 30 Clear. No A.B. to 10^h .
 31 Ov't. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night.
- April 1 Clear. No A.B. to 10^h .
 2 Very clear. No A.B. to 10^h .
 3 Mostly clear. No A.B. to 10^h . Almost wholly ov't at 10^h .
 4 Clear. No A.B. to $10\frac{1}{4}^h$.
 5 Ov't. Obs. impos. to 10^h , and doubtless all night.
 6 Clear. No A.B. to $9\frac{3}{4}^h$.
 7 Ov't. Obs. impos. to 10^h , and doubtless all night.
 8 Ov't. Obs. impos. to 11^h , and probably all night. [seen to 10^h .
 9 Considerably clouded and becoming more so: obs. poor: no A.B.
 10 Mostly clear. No A.B. to 10^h . Moon begins to interfere.
 11 Clear. Moon interferes. No A.B. seen to 10^h .
 12 Clear; some cirrous streaks and bands: moon: no A.B. seen to 10^h .
 13 Hazy about horizon: violent westerly wind.* (239)
 14 Clear, but somewhat hazy about hor.: moon: no A.B. seen to $10\frac{1}{2}^h$.
 15 Haze and thin cl'y sheets: moon: no A.B. seen to 10^h : obs. imperf.
 16 Ov't and rainy. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night.
 17 Ov't. Obs. impos. to 11^h , and doubtless all night.
 18 Ov't. Obs. impos. to 10^h , and doubtless all night.
 19 Ov't. Obs. impos. to 10^h , and all night. Rain during night.
 20 Ov't; some rain. Obs. impos. to 9^h , and doubtless all night.
 21 Ov't. Obs. impos. to 10^h at least. Mostly clear at sunrise of 22d.
 22 Clear. Moon. No A.B. to $9\frac{3}{4}^h$. [no A.B. seen.
 23 Much clouded: moon: obs. scarcely pos. to $9\frac{1}{2}^h$, and prob. all night:
 24 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 25 Ov't. Obs. impos. to 9^h , and doubtless all night.
 26 Ov't to 9^h , and doubtless all night.
 27 Ov't to 10^h .* (240)
 28 Ov't. Obs. impos. to 10^h , and probably most of the night.
 29 Clear. No A.B. to 10^h .
 30 Cloudy early part of evening.* (241)
- May 1 Almost wholly ov't.*
 2 Clear. No A.B. to 11^h .
 3 Mostly ov't to $10\frac{1}{2}^h$. Obs. nearly or quite impos.
 4 Ov't; some rain. Obs. impos. to 10^h , and prob. most of the night.
 5 Mostly ov't to 9^h . At $11\frac{1}{2}^h$ considerably ov't.* (242)

April 13th.—A fine display of the A.B. visible probably all night. At 7h 30m moon shining, and 45m before end of twilight I detected an auroral arch, obscure yet well formed, embracing about 100° horizontal extent, and about 8° high at vertex. I soon saw in and above it here and there red stais and imperfect streamers. Watched till 9h; wind uncomfortably strong. The phenomenon was constantly changing—arch breaking up, brightening in spots, fading, reappearing, &c. About 8h a segment of an arch, $42^\circ \pm$ alt. and 30° long. I saw but few streamers. After midnight (about 2h?) I looked and found a bright light low in N., and no streamers. I learn that between 9h 30m and 10h 30m there were many streamers, some 60° alt., and also waves.

April 27th.—Between 10h and 11h clouds broke away and revealed a bright A.B. There was then a broad arch spanning 90° , more or less, and about 10° high at vertex; much diffuse light about arch, but I saw no streamers. Much obscured by clouds. Did not observe it more than five minutes.

April 30th.—At 9h found the sky partly clear and a display of the A.B.; horizontal extent 70° more or less; sundry streamers, highest 40° ; not clearly defined. General light up to 10h 30m at least.

May 1st.—Through crevices in the clouds appeared some unusual light; perhaps slight A.B. Observation nearly impossible to 10h 15m, and probably all night.

May 5th.—About 12h clear, and no A.B. Between 2h and 3h A. M. (6th) a bright A.B.—luminous arch, but no streamers seen. *Fide* Professor E. T. Fitch.

1845.

- May 6 Much clouded, and obs. necessarily imperf. No A.B. seen to $9\frac{3}{4}^h$.
 7 Ov't. Obs. impos. to 10^h , and doubtless all night.
 8 Very clear. No A.B. to $9\frac{1}{2}^h$.
 9 Very clear. Moon begins to interfere. No A.B. seen to 10^h .
 10 Clear. Moon. No A.B. seen to 10^h .
 11 Hazy. Moon. No A.B. seen to $9\frac{3}{4}^h$.
 12 Hazy. Moon. No A.B. seen to 10^h .
 13 Mostly ov't to 9^h . At 10^h clear in N., and no A.B. Moon.
 14 Hazy, cirri. Moon. No A.B. seen to 9^h . After 9^h ov't, d's all n't.
 15 Ov't. Obs. impos. to 10^h , and doubtless all night.
 16 Ov't; slight drizzle at times: obs. impos. to $9\frac{1}{2}^h$, and d's all night.
 17 Ov't almost wholly. Obs. impos. to 10^h , and doubtless all night.
 18 Ov't; some rain. Obs. impos. to 10^h , and doubtless later.
 19 Partly cloudy. Moon. No A.B. seen to $9^h 20^m$.
 20 Cloudy, in part at least, to 9^h . No A.B. seen.
 21 Clear. Moon. No A.B. to $9\frac{1}{2}^h$.
 22 Ov't and raining. Obs. impos. to 10^h , and d's most of the night.
 23 Mostly clear. No A.B. to 10^h .
 24 Very clear. No A.B. to $9^h 55^m$.
 25 Very clear. No A.B. to $9\frac{1}{2}^h$.
 26 Mostly clear. No A.B. to 10^h .
 27 Hazy; otherwise mostly clear. No A.B. to 10^h .
 28 M'y cl'r, but toward 10^h becoming cl'y in N. No A.B. to $9^h 50^m$.
 29 M'y ov't to 10^h : obs. n'y or quite impos.: aft. 12^h very cl'r: no A.B.
 30 Exceedingly clear. No A.B. to $10^h 5^m$.
 31 Exceedingly clear. No A.B. to $10\frac{1}{2}^h$.
- June 1 Very clear. No A.B. to 10^h .
 2 Clear. No A.B. to $10\frac{1}{2}^h$.
 3 Much clouded. Obs. n'y impos. to $10\frac{1}{2}^h$, and p. later: no A.B. seen.
 4 Partly clouded. No A.B. to 10^h , but obs. unc. on ac't of clouds.
 5 N. much obs. to $9\frac{1}{2}^h$: A.B. susp.: no streamers seen. [F. B.]*
 6 Al't wh'y ov't to 12^h : no A.B. [F. B.] At N.Y. ov't; obs. impos. to
 7 Mostly clear. No A.B. to $10\frac{1}{2}^h$. [$10\frac{1}{2}^h$.]
 8 Clear. No A.B. to 10^h .
 9 Hazy; stars below 40° scarcely vis.: obs. n'y or quite impos. to $10\frac{1}{4}^h$.
 10 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 11 Very hazy: moon: stars below 25° alt. not vis.: no A.B. seen to 11^h .
 12 Ov't; slight drizzle. Obs. impos. to 11^h , and doubtless all night.
 13 Clear. Moon. No A.B. seen to 10^h .
 14 Clear. Moon. No A.B. seen to $10\frac{1}{2}^h$.
 15 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night. [n'y impos.
 16 Much clouded below alt. of 20° : moon: no A.B. seen to $10\frac{1}{4}^h$: obs.
 17 Very cl'r: moon: no A.B. to $10\frac{1}{2}^h$. [A.B. susp. about $11\frac{1}{2}^h$. (F. B.)]
 18 Ov't. Obs. impos. to $10\frac{1}{4}^h$, and doubtless all night.
 19 Clear to 9^h ; after that ov't to 10^h , and doubtless all night.
 20 Mostly ov't. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night.
 21 Mostly ov't. Obs. n'y or quite impos. to 10^h , and prob. all night.
 22 Ov't. Obs. impos. to $9\frac{3}{4}^h$, and d's all night. Rain during night.
 23 Much cl'ded: obs. embarrassed: no A.B. seen to $10\frac{1}{2}^h$, and p. none.
 24 Mostly ov't to $9\frac{3}{4}^h$. Rain between 8^h and 9^h .*

May 30th.—Observed zodiacal light: evident, but very ill defined. Extends to cluster in Cancer, and perhaps into the sickle in Leo; the star Pollux lies near the axis; if not, then a point a little nearer Castor, perhaps one-third the distance toward Castor.

June 5th.—E. C. H. at New York. Hazy. No A.B. to $10^h 15^m$.

June 24th.—About $9^h 30^m$ clouds in north slightly broken, and some unusual light suspected, but at 10^h a large opening in north, and no A.B. apparent.

1845.	
June 25	Clear. No A.B. to 10 ³ / ₄ h.*
26	Clear. No A.B. to 10 ^h .
27	Clear. No A.B. to 10 ¹ / ₂ h.
28	Ov't, rainy. Obs. impos. to 10 ^h , and doubtless later.
29	N. partly clouded: no A.B. between 9 ^h and 10 ^h : at 10 ^h n'y ov't in N.
30	Ov't early; n'y cl'r 9 ^h to 10 ^h : no A.B. seen to 10 ^h : slight A.B. c'd not [have been seen.
July 1	Mostly clear to 11 ^h . No A.B. to 11 ^h .
2	Ov't. Obs. impos. to 10 ^h , and probably all night.
3	Very clear. No A.B. to 10 ^h .
4	Ov't to 9 ¹ / ₂ h. Clearing up about 10 ^h . No A.B. to 10 ¹ / ₄ h.
5	Very clear. No A.B. to 10 ¹ / ₄ h.
6	Somewhat cloudy. No A.B. to 9 ¹ / ₂ h: at 2 ^h A.M. very cl'r: no A.B.
7	Considerably clouded. No A.B. seen to 10 ¹ / ₂ h. Obs. embarrassed.
8	Mostly clear. No A.B. to 10 ^h .*
9	Clear. No A.B. seen to 2 ¹ / ₂ h A. M. of 10th.
10	Very clear. Moon begins to interfere. No A.B. to 11 ^h .
11	Tolerably clear, although hazy. Moon. No A.B. to 10 ^h .
12	Mostly clear, but hazy towards hor.: moon: no A.B. seen to 9 ¹ / ₂ h.
13	Mostly clear, but hazy towards hor.: moon: no A.B. seen to 10 ^h .
14	Ov't. Obs. impos. to 10 ^h , and doubtless later.
15	Mostly ov't. Obs. nearly impos. to 10 ^h . Moon. No A.B. seen.
16	Nearly clear. Moon. No A.B. seen to 10 ¹ / ₄ h.
17	Clear. Moon. No A.B. to 10 ^h .
18	Clear. Moon. No A.B. to 10 ^h .
19	Mostly clear. Moon. No A.B. seen to 10 ¹ / ₂ h.
20	Considerably clouded; but clear space about the north: moon.*
21	Mostly clear; much obs. at 10 ^h : moon: no A.B. seen to 10 ^h .
22	Clear. Moon. No A.B. seen to 10 ^h .
23	Very clear. No A.B. to 10 ^h .
24	Ov't to 9 ³ / ₄ h, and doubtless later.* (243)
25	Ov't, almost wholly. Obs. impos. to 9 ³ / ₄ h, and doubtless later.
26	Ov't. Obs. impos. to 10 ^h , and doubtless later.
27	Mostly clear, but small clouds hanging about N. No A.B. to 10 ^h .
28	Mostly clear; quite clear in N. about 10 ^h . No A.B. to 10 ^h .* (244)
29	Ov't. Obs. impos. to 10 ^h , and probably all night.
30	Ov't and raining. Obs. impos. to 10 ^h , and doubtless much later.
31	Mostly clear, clouds coming over about 10 ^h : no A.B. to 10 ^h .* (245)
Aug. 1	Nearly clear.* (246)
2	Much cl'ded; at 10 ^h n'y cl'r in N. except low cloud. No A.B. seen.
3	Somewhat clouded in N. to 10 ^h .*

June 25th.—A.B. seen at Worcester, Mass.—*Thirteenth Annual Report of Lunatic Asylum.* No particulars given.

July 8th.—Brilliant A.B. seen at Worcester, Mass.—*Thirteenth Ann. Rep. of Lunatic Asylum.* No other particulars.

July 20th.—North seemed quite light, probably due to moonlight. No A.B. surely seen to 10^h 15m.

July 24th.—At 1^h A. M. (25th) I looked out from an open window and found N. sky very clear, and moon shining. In N. appeared more than usual light, and I am very much inclined to think it an A.B.—saw no streamers—about 20° horizontal extent, 2° high. If trees had not obstructed the view I could have determined the case with certainty. [A.B. seen at Worcester, Mass.—*Thirteenth Ann. Rep. of Lunatic Asylum.* No details.]

July 28th.—Faint auroral arch from 9^h 30m, 60° or 70° horizontal extent. No streamers. [F. B.]

July 31st.—Faint light in N., probably auroral. [F. B.]

Aug. 1st.—A faint auroral light visible from about 9^h 30m onward to 10^h 30m; seen also after midnight. A diffuse light, perhaps 20° horizontal extent, very indefinite above. I saw no streamers.

Aug. 3d.—No A.B. to 10^h, unless a faint light between two clouds. After midnight looked out, and saw no A.B.; sky then very clear.

1845.

- Aug. 4 Clear. No A.B. to 10^h.* (247)
 5 Nearly clear, but some cloudiness in N. No A.B. to 11^h.
 6 N'y cl'r: within 8^h to 10^{½h}: cl'ds in N.: no A.B. from 10^{¼h} to 10^{½h}.
 7 Mostly clear, except N.: ov't there at 9^{½h}: no A.B. seen to 9^{½h}.
 8 Much cl'ded: obs. n'y impos. to 10^h; p. all n't: no A.B. seen to 10^h.
 9 M'y clear from 9^{½h} to 11^h. No A.B. seen, but obs. p'y obstructed.
 10 Ov't almost wholly. Obs. impos. all night.
 11 Ov't and rainy. Obs. impos. to 10^h, and probably all night.
 12 Clear, yet hazy about horizon. Moon. No A.B. seen to 10^{½h}.
 13 Ov't. Obs. impos. to 10^h at least, and doubtless later.
 14 Ov't. Obs. impos. to 10^h, and probably all night.
 15 Clear. Moon. No A.B. to 10^{¼h}.
 16 Clear. Moon. No A.B. seen to 9^{¾h}.
 17 Mostly clear. Moon. No A.B. seen to 9^{½h}.
 18 Ov't. Obs. impos. to 11^h at least.
 19 M'y cl'r from 8^h to 9^h: no A.B.: after 9^h ov't to 10^{½h} in N., p. later.
 20 Ov't. Obs. impos. to 10^{½h} at least.
 21 Ov't. Obs. impos. to 11^h, and probably all night.
 22 Ov't. Obs. impos. to 10^h, and doubtless all night.
 23 Ov't. Obs. impos. to 9^{½h}, and doubtless all night.
 24 Mostly clear; flying clouds about N. No A.B. seen to 9^{¼h}.
 25 Clear. No A.B. to 11^h.
 26 North much embarrassed by floating clouds. No A.B. seen to 10^{¼h}.
 27 Ov't and rainy. Obs. impos. to 10^h, and probably most of night.
 28 Much clouded most of evening. At 10^h nearly clear, and no A.B.
 29 Flying cl'ds; obs. necessarily imperf.: at 9^{½h} nearly cl'r.* (248)
 30 Very cloudy early part of evening. At 9^h and after mostly clear.*
 31 Mostly clear. No A.B. to 9^{¼h}. No A.B. at 1^h A. M. of Sept. 1st.
 Sept. 1 Ov't to 8^{½h} at least. Partly clear after 9^h, but did not then watch.
 2 Mostly ov't to 10^h. Partly clear about 8^h, and no A.B. seen.
 3 Very clear. No A.B. to 9^h.
 4 Ov't; thunder shower from 8^h to 9^h. Obs. impos. to 10^h.*
 5 Much clouded; clear spaces occasionally. No A.B. to 10^h.
 6 Clear. No A.B. to 10^h.
 7 Clear. Moon. A.B. suspected.* (249)
 8 Clear in N. to 8^h; after that m'y ov't to 10^h at least: no A.B. seen.
 9 Cl'y most of ev'g: at 9^{½h} and aft. n'y cl'r: moon: no A.B. seen to 10^h.
 10 Much clouded at times: moon: no A.B. seen to 11^h. [seen to 10^{½h}.
 11 Mostly ov't to 9^h; from 9^h to 10^{½h} tolerably clear: moon: no A.B.
 12 Clear. Moon. No A.B. seen to 9^{½h}.
 13 Ov't. Obs. impos. to 10^h, and doubtless all night.
 14 M'y ov't with flying clouds: moon: obs. n'y or quite impos. to 9^{½h}.
 15 Mostly clear. Moon. No A.B. seen to 10^h.
 16 M'y cl'r: moon: no A.B. seen to 10^h: about 10^h al't wh'y ov't in N.
 17 Mostly clear to 9^h: moon: no A.B. seen: after 9^h mostly ov't to 10^h.
 18 M'y cl'r: moon: 7^h to 9^{½h} low cl'ds and l'tning: no A.B. seen to 9^{½h}.

Aug. 4th.—Auroral streamers between 9h and 10h. Numerous, faint, 10° high. [F. B.]

Aug. 29th.—A.B. slightly suspected. [A.B. seen at Worcester, Mass.—*Thirteenth Rep. Lunatic Asylum*. No details.]

Aug. 30th.—No A.B. to 9h 30m, but some unusual light slightly suspected. At 1h 30m A. M. of 31st clear, and no A.B. [At Montreal, Canada, slight A.B. *Fide* Professor Olmsted.]

Sept. 4th.—Clouds breaking away about 10h, showing what seemed an unusual light in N., but probably a deception.

Sept. 7th.—After midnight, the moon having set, I looked out and thought there was a faint auroral light in the N. Saw no streamers.

1845.

- Sept. 19 Som't hazy: moon rose at 8^h: no A.B. seen to 10^h: at 10^h cl'y.
 20 Clear. No A.B. to 9¹/₄^h.
 21 Very clear. No A.B. to 9¹/₂^h.
 22 Very clear. No A.B. to 10^h.
 23 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 24 Mostly clear.* (250)
 25 Mostly ov't. At 9^h wholly ov't, and nearly so to 10^h.
 26 Ov't, rain: obs. impos. to 9¹/₂^h. [P'y cl'r at 8¹/₂^h, and no A.B. (F.B.)]
 27 Clear mostly. Probably a very faint A.B.* (251)
 28 Somewhat cloudy. No A.B. to 8¹/₄^h, and none at 4^h A. M. of 29th.
 29 Clear. No A.B. to 10^h.
 30 M'y cl'r, but gradually clouding, and by 10^h m'y ov't: no A.B. seen.
- Oct. 1 Clear. No A.B. to 9¹/₂^h.
 2 Clear. No A.B. to 10^h.
 3 Mostly ov't; oc'l openings: obs. n'y impos. to 10^h: no A.B. seen.
 4 Ov't. Obs. impos. to 10^h.
 5 Ov't and rainy. Obs. impos. to 8¹/₂^h, and doubtless all night.
 6 Ov't. Obs. impos. to 10^h, and probably all night.
 7 M'y ov't: about 9^h partly cl'r about 15^m: moon: no A.B. seen.
 8 Much clouded. Moon. No A.B. seen to 10^h.
 9 Clear. Moon. A.B. seen all the evening.* (252)
 10 Ov't to 10^h at least. Obs. impos.
 11 P'y cl'r to 8^h: moon: obs. n'y impos. to 8^h: no A.B. seen: aft. 8^h ov't.
 12 Ov't and raining. Obs. impos. to 10^h, and probably all night.
 13 Clear: moon: no A.B. seen to 10^h: at intervals d'g n't saw no A.B.
 14 Considerably clouded: moon: no A.B. seen to 9^h: obs. imperfect.
 15 Clear. Moon. No A.B. seen to 9³/₄^h.
 16 Partly cloudy. Moon. No A.B. seen to 10^h.
 17 Clear. Moon most of the evening. No A.B. seen to 10^h.
 18 Clear. No A.B. seen to 10^h.
 19 Hazy: no A.B. seen to 9^h: a faint display c'd hardly have been seen.
 20 Ov't almost wholly. Obs. impos. to 9¹/₂^h, and doubtless all night.
 21 Clear. A.B. seen most of evening, but at times very faint.* (253)
 22 Clear. No A.B. to 10^h.
 23 Clear. No A.B. to 10^h. I did not observe personally.
 24 Hazy. No A.B. to 10^h.
 25 Hazy. No A.B. to 10^h.
 26 Very hazy. No A.B. to 10^h.
 27 Hazy. No A.B. to 9¹/₄^h.
 28 Hazy. No A.B. to 10^h.
 29 Clear. No A.B. to 10^h.
 30 Mostly ov't. Obs. impos. to 10^h.
 31 Ov't most of evening. At 10^h nearly clear, and no A.B.
- Nov. 1 Ov't; some rain. Obs. impos. to 9¹/₂^h, and doubtless all night.
 2 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.

Sept. 24th.—A.B. seen from about 9h 30m to 11h at least, 60° to 80° horizontal extent illumined; bank at times 3° to 5° high. I saw no streamers, but did not watch many minutes.

Sept. 25th.—A.B. suspected; breaks in the clouds in the N., showing what seemed more than usual light. Uncertain.

Sept. 27th.—The N. seemed to have a slight whitish tinge, but I saw no bank or arch. At 10h 5m I saw for about three minutes what I took to be a streamer, near N. 5° E., about 4° long, and moving westward. Some small clouds just then embarrassed observation. I presume there is a slight A.B. this evening.

Oct. 9th.—About 60° horizontal extent illumined. Much of the time an arch, and once a group of dim streamers, not reaching higher than 10°.

Oct. 21st.—About 7h many streamers, not very bright, tallest reaching altitude of about 15°, drifting westward; 50° to 70° of horizontal extent illumined, with faint arch.

1845.

- Nov. 3 Ov't and rainy. Obs. impos. to 11^h, and doubtless later.
 4 Ov't and rainy. Obs. impos. to 10¹/₂^h, and doubtless later.
 5 Ov't early; cl'ring at 8^h, clear after 9^h: moon: no A.B. to 10¹/₂^h.
 6 Clear. Moon. No A.B. to 9¹/₂^h.
 7 Many flying cl'ds n'y precluded obs. Moon. No A.B. seen to 10^h.
 8 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 9 Ov't. Obs. impos. to 8^h, and probably all night.
 10 Clear. Moon. No A.B. seen to 10^h, and none at 1¹/₂^h A. M. of 11th.
 11 Mostly ov't. Obs. impos. to 10^h, and probably most of the night.
 12 Clear. Moon. No A.B. seen to 10^h. Within from 6¹/₂^h to 9¹/₂^h.
 13 Partly clear. Moon eclipsed this evening. No A.B. seen to 9¹/₂^h.
 14 Mostly clear. Moon. No A.B. seen to 10¹/₂^h.
 15 Clouded at times; occasionally clear in N.: moon: no A.B. to 10^h.
 16 Very hazy. No A.B. seen to 9¹/₂^h.
 17 Mostly ov't; rain about 9¹/₂^h: obs. impos. to 10^h, and prob. all night.
 18 Much clouded. Obs. nearly impos. No A.B. seen to 10^h.
 19 Very clear. No A.B. to 10^h.
 20 Clear, but somewhat hazy. No A.B. to 10^h.
 21 Very clear. No A.B. to 10^h.
 22 Clear most of evening; very cloudy at 10^h. No A.B. to 10^h.
 23 Clear. No A.B. to 10^h.
 24 Clear. No A.B. to 10^h.
 25 Cloudless, but hazy. No A.B. to 10^h.
 26 Hazy; by 10^h quite ov't: no A.B. seen to 10^h: within 7¹/₂^h to 9¹/₂^h.
 27 Ov't. Obs. impos. to 10^h.* (254)
 28 Mostly clear. No A.B. to 9¹/₂^h.
 29 Ov't most of ev'g; at 10¹/₂^h clouds much broken: no A.B. then.
 30 Ov't; sleet falling. Obs. impos. to 10^h, and doubtless all night.
 Dec. 1 Ov't. Obs. impos. to 10^h at least: clear at 5¹/₂^h A. M.: no A.B.
 2 Very clear. No A.B. to 10^h.* (255)
 3 Almost wholly ov't to 10¹/₄^h at least.* (256)
 4 Ov't and raining. Obs. impos. to 10^h, and probably much later.
 5 Very clear. Moon. No A.B. seen to 10¹/₄^h.
 6 Mostly ov't; occasional clear spaces. Moon. No A.B. seen to 10^h.
 7 Clear, except cirri about N.: moon: no A.B. seen to 9¹/₄^h: ov't at 5^h.
 8 Ov't; sleet falling. Obs. impos. to 10¹/₂^h, and doubtless all night.
 9 Ov't: obs. impos. to 10^h: at 5^h 5^m cl'r except low cl'd in N.: no A.B.
 10 Mostly clear. Moon. No A.B. seen to 10^h.
 11 P'y cl'r to 7^h; 7^h to 10^h m'y ov't; aft. p'y cl'r: moon: no A.B. seen
 12 Clear. Moon. No A.B. seen to 10^h. [to 10¹/₂^h: obs. unc.
 13 Clear to about 10^h: moon: no A.B.: at 10^h ov't with fleecy clouds.
 14 Ov't and raining. Obs. impos. to 9¹/₂^h, and doubtless all night.
 15 Much clouded. Moon. No A.B. seen to 10^h. Ov't at 10^h.
 16 Clear: no A.B. cert. seen to 10^h, and yet two or three times susp.
 17 Ov't. Obs. almost or quite impos. to 10^h, and probably all night.
 18 Ov't almost wholly. Obs. impos. to 10^h, and probably all night.

Nov. 27th.—A.B. seen by me about 5^h 15^m A. M. of 28th. Sky very clear. I saw only a general light about N. horizon; no definite streamers, but an undoubted A.B. Watched about three minutes.

Dec. 2d.—At 4^h 2^m A. M. of 3d I saw a distinct A.B. About 30° horizontal extent illumined, 8° more or less in center. I saw no distinct arch or streamers, but the trees interfere.

Dec. 3d.—A conspicuous A.B. seen through a long narrow opening in the clouds in N. horizon. Several bright streamers about 8^h, but the clouds did not permit any determination of the extent of the display. I infer it to have been a very considerable one. Light strong as late as 10^h 15^m.

1845.

- Dec. 19 Ov't. Obs. impos. to 10^h, and doubtless all night.
 20 Cl'r a few minutes at 6^h: no A.B.: ov't from 6½^h to 9½^h: obs. impos.
 21 Very clear. No A.B. to 9^h.
 22 Clear most of ev'g: no A.B. seen to 10^h: considerably cl'ded aft. 8^h.
 23 Clear. No A.B. to 10^h. About 10^h becoming cloudy.
 24 Ov't. Obs. impos. to 10^h, and doubtless all night.
 25 Ov't to 10^h, and doubtless all night.
 26 Ov't and snowing. Obs. impos. to 10¼^h.
 27 Clear early in ev'g: no A.B. seen: ov't at 9½^h, and to 10^h at least.
 28 Mostly clear after 7^h. No A.B. to 10^h.
 29 Clear. No A.B. to 10^h.
 30 Ov't entirely.* (257)
 31 Clear. A.B. slightly suspected. None certain to 10^h.

1846.

- Jan. 1 Ov't. Obs. impos. to 12^h, and doubtless all night.
 2 Almost wholly ov't. Obs. impos. to 10^h, and probably all night.
 3 Mostly ov't. Moon. Obs. nearly impos. to 10^h.
 4 Clear: moon: no A.B. at 6^h, at 10^h, or at 3^h A.M.: sky at 5^h p'y obsc.
 5 N'y cl'r; cirrous streaks here and there: moon: no A.B. seen to 10^h.
 6 Ov't. Obs. impos. to 10¼^h, and d's all night: began to rain d'g n't.
 7 Ov't, drizzling. Obs. impos. to 9¾^h, and doubtless all night.
 8 Ov't. Obs. impos. to 10¼^h, and probably later.
 9 Ov't. Obs. impos. to 10^h.
 10 Mostly ov't. Moon. Obs. impos. to 10^h, and probably all night.
 11 Cl'r to about 8^h: moon: no A.B.: after 8^h ov't: obs. impos. 8^h to 10^h.
 12 Ov't almost completely. Obs. impos. to 11^h, and prob. all night.
 13 Clear. Moon. No A.B. to 10½^h.
 14 Clear. Moon rose at 7½^h. No A.B. to 11^h.
 15 Al't wholly ov't. Obs. impos. to 10½^h, and doubtless all night.
 16 Ov't, raining and snowing. Obs. impos. to 10^h, and d's all night.
 17 Ov't and snowing. Clear at sunrise of 18th.
 18 Very clear. No A.B. to 10^h.
 19 Clear: no A.B. to 10^h, or pos. a very faint aur. light bet'n 9^h and 10^h.
 20 Almost wholly ov't. Obs. impos. to 10^h, and doubtless all night.*
 21 Ov't, snowing: obs. impos. to 10^h, p. much later: n'y cl'r at 6^h A.M. of
 22 Clear. No A.B. to 10¼^h. [22d.
 23 Very clear. A.B. seen, with intermissions, from 6^h to 11^h.* (258)
 24 Clear chiefly to about 8^h, and no A.B. After 8^h ov't.
 25 Mostly clear. No A.B. seen.
 26 Ov't. Obs. impos. to 10^h, at 12^h, at 3^h A. M., and d's all night.
 27 Clear. No A.B. seen to 12^h.
 28 Considerably clouded. A.B.* (259)
 29 Ov't. Obs. impos. to 10¼^h, and doubtless all night.
 30 Ov't. Obs. impos. to 10½^h, and d's all night: some rain in ev'g.
 31 Partly clear, but N. much obstructed.*

Dec. 30th.—Between 9^h and 10^h, and at 10^h, I strongly suspected an A.B.; the light may have been due to thinness of clouds on the northern horizon. (Reported to me that later the sky was more or less clear, and a considerable A.B. visible. No details.)

Jan. 3d.—A.B. suspected, but impossible to be confident on account of clouds and moon.

Jan. 20th.—About 10^h suspected some unusual light along N. horizon; probably due to thinness of clouds.

Jan. 23d.—Horizontal extent generally about 50°; altitude at vertex 3° more or less. At times segments of a distinct arch, but no streamers seen.

Jan. 28th.—Not seen until about 9^h, as I was within. From this time up to 10^h there was no great change; a strong light about 7° high at vertex, and brightest near the border, cutting the horizon about 80° apart. All very much embarrassed by clouds. I saw no streamers.

Jan. 31st.—Observation scarcely possible to 10^h at least. Some unusual light suspected in N. between 9^h and 10^h.

1846.

- Feb. 1 Ov't. Obs. impos. to 10^h, and doubtless all night.
 2 Ov't. Obs. impos. to 10¹/₂^h, and no doubt all night.
 3 Ov't. Obs. impos. to 10^h, and doubtless all night.
 4 Considerably cl'ded: moon: obs. much embarrassed: no A.B. to 10^h.
 5 Mostly clear. Moon. No A.B. seen to 10^h. [A.B. seen.
 6 Nearly cl'r; becoming hazy: moon: unwell and c'd not watch: no
 7 Ov't; slight rain. Obs. impos. to 10^h, and d's most of the night.
 8 Clear. Moon. No A.B. seen to 9¹/₄^h.
 9 Clear. Moon. No A.B. seen to 10¹/₂^h.
 10 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 11 Ov't and snowing. Obs. impos. to 10^h, and doubtless all night.
 12 Cl'r to 8^h; aft. m'y ov't to 10¹/₂^h: no A.B. seen to 8^h: moon rose at 7^h.
 13 Cl'r to 7¹/₂^h: no A.B.: within till 9^h, then ov't: at 11^h cl'r: moon: no
 14 Ov't. Obs. impos. to 10¹/₂^h, and d's all night. [A.B. seen.
 15 Ov't and snowing. Obs. impos. to 10^h, and probably all night.
 16 M'y ov't; wh'y so after 8^h: obs. impos. to 10^h, and d's all night.
 17 Partly clear. No A.B. seen to 10^h, but obs. embarrassed by cl'ds.
 18 Very clear. No A.B. to 10¹/₄^h.
 19 Almost wholly ov't: obs. nearly impos. to 10¹/₂^h, and d's all night.*
 20 Clear at 6^h: no A.B.: m'y ov't to 8¹/₂^h; aft. clear: no A.B. to 10^h.
 21 Mostly clear, but at 10^h wholly ov't. No A.B. to 9¹/₂^h.
 22 M'y cl'r: no A.B. to 9¹/₂^h, when n'y ov't: at 2^h cl'r in N. except low
 23 Mostly clear. No A.B. to 10¹/₂^h. [cl'd: no A.B. then.
 24 Nearly cl'r, becoming hazy d'g the ev'g. No A.B. cert. seen to 9^h.
 25 A.B., most of evening obstructed by clouds. (260)
 26 Clear. No A.B. certainly seen to 10^h, but somewhat susp. at times.
 27 Ov't. Obs. impos. to 10¹/₄^h, and doubtless all night.
 28 Ov't. Obs. impos. to 11^h, and doubtless all night.
- Mar. 1 Mostly clear. Moon. No A.B. seen to 10^h. Within from 7^h to 9^h.
 2 Very hazy to 9^h: moon: obs. n'y impos. to 9^h; aft. more cl'r: no A.B.
 3 Nearly clear. Moon. No A.B. seen to 11¹/₂^h. [seen to 11^h.
 4 Mostly clear. No A.B. seen to midnight.
 5 Clear: moon: no A.B. seen to 11^h. [very cl'r: no moon: no A.B.
 6 Ov't to about 10^h, after cl'ring: moon: no A.B. at 10^h 5^m: at 4^h A.M.
 7 Ov't until 10^h at least. Obs. impos.
 8 Ov't. Obs. impos. to 9¹/₄^h, and doubtless later.
 9 Very clear. Moon. No A.B. to 10^h.
 10 Clear. Moon. No A.B. seen to 10^h.
 11 Nearly clear. Moon. No A.B. seen to 10^h.
 12 Al't wh'y ov't: moon: cl'ds breaking about 9¹/₂^h: no A.B. then seen.
 13 Ov't; rain during night. Obs. impos. to 10^h, and d's all night.
 14 Cloudy most of evening to 10^h.*
 15 P'y cl'r. No A.B. seen to 10^h, but N. much obstructed by cl'ds.
 16 Ov't most of ev'g; p'y cl'r 9^h to 10¹/₂^h: no A.B. seen to 10¹/₂^h: obs. unc.
 17 Clear.* (261)
 18 Very clear. No A.B. to 9¹/₂^h.
 19 Clear. No A.B. to 10¹/₂^h.*
 20 Mostly ov't, and obs. necessarily uncertain. No A.B. seen to 10¹/₂^h.

Feb. 19th.—At various times in the evening I suspected an unusual light in the N., perhaps an A.B., perhaps due to thinness of clouds in that quarter.

March 14th.—About 8^h suspected some unusual light in N., but probably due to moon just rising. At 10^h 30^m clear, and no A.B.

March 17th.—A very slight auroral illumination, as I think, most of evening, especially about 10^h. I saw no arch, no streamers, yet the N. seems lighter than other quarters. The presence of Galaxy in the north seems insufficient to cause the appearances.

March 19th.—Some slight auroral appearances slightly suspected but very doubtful.

1846.

- Mar. 21 Clear. No A.B. to 10^h.
 22 Clear. No A.B. to 9¹/₂^h.
 23 Ov't. Obs. impos. to 10¹/₂^h, and probably all night.
 24 Ov't and rainy. Obs. impos. to 11^h, and doubtless all night.
 25 Ov't, drizzling mist. Obs. impos. to 11^h, and doubtless all night.
 26 Ov't, except ab't 8^h; no A.B. then: aft. obs. impos. to 9³/₄^h, d's all n't.
 27 P'y cl'r to 7¹/₂^h: no A.B.: aft. ov't to 9¹/₂^h; then cl'r: no A.B. to 10^h.
 28 Ov't to about 9^h, and obs. impos.: too cloudy in N. for obs. to 10^h.
 29 Considerably clouded and obs. necessarily unc. None seen to 8¹/₂^h.
 30 Ov't most of evening to 10^h. Obs. nearly impos. None seen.
 31 Clear. Moon. No A.B. seen to 10^h.
 April 1 Clear. Moon. No A.B. seen to 10¹/₂^h.
 2 Clear. Moon. No A.B. seen to 10¹/₂^h.
 3 Clear. Moon. No A.B. seen to 10¹/₄^h.
 4 Clear. Moon. No A.B. seen to 10^h.
 5 Quite hazy and cl'y: moon: obs. nearly impos. to 10^h: none seen.
 6 Clear. Moon. No A.B. seen to 10^h.* (262)
 7 Ov't. Obs. impos. to 10^h, and doubtless all night.
 8 Ov't. Obs. impos. to 10^h, and doubtless later.
 9 Many cirri and some haze: moon: no A.B. seen to 10¹/₄^h: obs. unc.
 10 Clear to 7¹/₂^h; after that ov't and misty: obs. impos. to 10¹/₂^h at least.
 11 M'y cl'r to 9^h: moon: no A.B. seen: aft. 9^h too cl'y to 10^h at least.
 12 Ov't, with cumulus clouds. Moon.* (263)
 13 Clear: moon rose about 9^h: no A.B. seen to 10¹/₄^h. [seen 9^h to 10^h.
 14 M'y cl'r to 9^h: no A.B. [F. B.] At 9^h cl'ding, by 10^h ov't: no A.B.
 15 Clear. A.B. first seen about 9^h.* (264)
 16 Clear. A.B. seen from 8¹/₂^h to 10^h.* (265)
 17 Somewhat hazy. No A.B. to 10^h.
 18 Hazy about horizon. No A.B. to 10^h.
 19 Clear. No A.B. to 9^h.
 20 Nearly cl'r, but hazy about hor., and becoming cl'y in N. about 9^h.
 21 Nearly clear; some haze. No A.B. to 9¹/₂^h. [obs. unc.
 22 Much obsc. by cl'ds: within 7¹/₂^h to 9^h: no A.B. seen from 9^h to 10^h:
 23 Ov't. Obs. impos. to 10¹/₂^h, and probably all night.
 24 Ov't. Obs. impos. to 9¹/₄^h, and d's all night. Rain during ev'g.
 25 North considerably clouded: no A.B. seen to 10^h: obs. nec'y unc.
 26 North considerably clouded: no A.B. seen to 9¹/₂^h: obs. nec'y unc.
 27 Clear. No A.B. to 10¹/₂^h.
 28 Cloudy. No A.B. seen to 10^h. Faint A.B. would not be visible.
 29 Ov't and rainy. Obs. impos. to 10^h at least, and prob. all night.
 30 Cl'r to about 8¹/₂^h, when it became cl'y. [F. B.] At 12³/₄^h cl'r, no A.B.
 May 1 Ov't and drizzly. Obs. impos. to 9¹/₂^h, and doubtless all night.
 2 Ov't. Obs. impos. to 9¹/₂^h, and probably all night.
 3 Mostly clear, but embarrassed by flying clouds. Moon.*
 4 Ov't. Obs. impos. to 10^h, and probably all night.
 5 Too cloudy for obs. to 10¹/₂^h, and probably all night.

April 6th.—Between 3h 25m and 4h A. M. of 7th, A.B., much obscured by clouds, but certain. Several imperfect streamers and bright spots, none over 5° high. Being occupied with the comet (Bond's) near Cassiopeia, I could not give much attention to the A.B.

April 12th.—I strongly suspected the presence of an A.B., and at times could scarcely doubt it; this was from 8h 30m to 9h 30m. The sky remained overcast up to 9h 30m at least. The appearances may possibly have been caused by the moon, but probably not.

April 15th.—Several streamers 1° or 2° high, and general light after, 3° to 5° high to 11h. Did not watch especially, being occupied with Biela's comet.

April 16th.—Between 8h and 9h a double arch about 5° and 3° high, and 70° to 80° span; and about 10h numerous streamers, some 20° to 30° long.

May 3d.—No A.B. certainly seen to 9h 15m, yet suspected.

1846.

- May 6 Ov't, breaking away about $9\frac{1}{2}^h$, but not in N.: obs. impos. to 10^h .
 7 Ov't; drizzling rain part of ev'g: obs. impos. to 9^h , and d's all n't.
 8 Ov't. Obs. impos. to 10^h , and doubtless all night.
 9 Ov't. Obs. impos. to 8^h , and d's all night: heavy showers in night.
 10 Ov't: A.B. susp. about 9^h , but the appearances may be due to moon.
 11 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and prob. most of night: cl'y 12^h to 1^h .
 12 Clear. A.B., but a very transient display, at $8^h 52^m$.* (266)
 13 Clear. A.B., first seen at $8^h 55^m$ and watched to $9\frac{1}{2}^h$ closely.* (267)
 14 Ov't until $9\frac{1}{2}^h$. At 10^h sky n'y cl'r, but cl'ds in N.: no A.B. then.
 15 Ov't to about 9^h : bet'n 9^h and 10^h m'y cl'r, and no A.B. seen to 10^h .
 16 Ov't. Obs. impos. to 10^h , and probably all night.
 17 Ov't and misty. Obs. impos. to 10^h , and probably all night.
 18 Nearly clear. A.B., slight.* (268)
 19 Clear. A.B., slight.* (269)
 20 M'y cl'r, but N. obsc. by cl'ds to alt. of about 40° to $9^h 20^m$: obs. n'y
 21 Very clear. No A.B. seen to $9\frac{1}{2}^h$. [impos.
 22 Cirri: no A.B. seen to $10\frac{1}{2}^h$; a faint A.B. c'd hardly have been seen.
 23 M'y cl'r to 9^h , no A.B.: at 9^h ov't: at $9\frac{1}{2}^h$ n'y cl'r, no A.B.: at 10^h n'y
 24 Very clear. No A.B. to $9\frac{1}{2}^h$. [ov't.
 25 Ov't. Obs. impos. to 10^h .
 26 Ov't; misty. Obs. impos. to 10^h , and doubtless all night.
 27 Ov't; mist and rain. Obs. impos. to 10^h , and doubtless all night.
 28 Ov't; drizzling. Obs. impos. to $9\frac{1}{4}^h$, and doubtless all night.
 29 Ov't; drizzling. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night.
 30 Ov't. Obs. impos. to 10^h , and doubtless all night.
 31 Ov't. Obs. impos. to 10^h , and doubtless all night.
 June 1 Much embarrassed by clouds. Moon. No A.B. seen to $10\frac{1}{2}^h$.
 2 Ov't. Obs. impos. to 10^h , and doubtless later.
 3 Clear. Moon. No A.B. seen to 10^h .
 4 Ov't and raining. Obs. impos. to 10^h , and doubtless all night.
 5 Ov't and raining. Obs. impos. to $9\frac{3}{4}^h$, and doubtless all night.
 6 Nearly clear in N. Moon. No A.B. seen to $10\frac{1}{2}^h$.
 7 Clear. Moon. No A.B. seen to $9\frac{1}{4}^h$. [unc.
 8 Much embarrassed by cl'ds: moon: no A.B. seen to $10\frac{1}{6}^h$; obs. som't
 9 Ov't. Obs. impos. to 10^h , and doubtless later.
 10 Somewhat obsc. by cloud streaks in N.: moon: no A.B. seen to 10^h .
 11 Ov't. Obs. impos. to 10^h , and doubtless all night.
 12 M'y cl'r; some hazy streaks: no A.B. to 10^h : did not watch closely.
 13 Mostly clear. No A.B. to $10\frac{1}{4}^h$.
 14 Clear. A.B. A fine display.* (270)

May 12th.—Looking out at that time I found several streamers (one extending up 25° more or less) not very bright, yet distinct. I saw no bank of light and no arch. The moon was just rising. I looked several times after this, but could see no auroral traces up to $9^h 40^m$. The moon might conceal them if very faint.

May 13th.—Groups of streamers sprung up here and there, some reaching up 35° and mingled with amorphous luminous matter; rapidly shifting, and occasionally for a few minutes wholly invisible. During the whole time there was scarce any general light, or arch, or bank. At intervals, streamers at points distant 70° on horizon.

May 18th.—From 9^h to 10^h a faint general illumination. I saw no streamers. Mr. F. Bradley saw two streamers about 9^h .

May 19th.—None seen until about $9^h 30^m$; from this to 10^h were occasional dim broad streamers reaching 6° to 10° altitude, intermingled with luminous patches; faint and transient. No general light or luminous arc. Streamers W. of N. moved westward. Streamers E. of N. uncertain.

June 14th.—Suspecting slightly some unusual illumination in north, I went at $9^h 28^m$ to canal bridge, where there is a clear horizon, and saw but little at first. At $9^h 30^m$ a streamer appeared about N. 20° W., and in one or two minutes ten or fifteen more, occupying about 60° or 70° horizontal extent. From that time to $9^h 48^m$ streamers numerous appeared and vanished, reaching up from 10° to 30° of altitude, perpetually shifting, but direction not easily determined. Saw no arch; streamers arose from very near horizon; but little general light. At $9^h 48^m$ very little auroral illumination.

1846.

- June 15 Mostly ov't; in N. clear enough for obs: no A.B. from 9 $\frac{1}{2}$ ^h to 9^h 50^m.
 16 M'y ov't and obs. n'y impos. to 10 $\frac{1}{4}$ ^h; then partly cl'r above 35° alt.
 17 Hazy and partly ov't. Obs. nearly impos. to 10^h: no A.B. seen.
 18 Ov't. Obs. impos. to 10^h, and probably all night.
 19 Ov't. Obs. impos. to 10^h, and probably all night.
 20 Clear. No A.B. to 10^h.
 21 Ov't. Obs. impos. to 10^h, and probably all night.
 22 Considerably clouded. Obs. necessarily unc. No A.B. seen to 10^h.
 23 Mostly or altogether ov't. Obs. probably impos. to 10^h at least.
 24 Ov't, rain. Obs. impos. to 10^h, and probably all night.
 25 Much clouded; rain: from 9^h to 9 $\frac{1}{2}$ ^h broken clouds: no A.B. seen.
 26 Ov't and raining. Obs. impos. to 10^h, and probably all night.
 27 Mostly clear. No A.B. to 10^h.
 28 Ov't and rainy to 9 $\frac{1}{2}$ ^h, and p. all night. Obs. impos.: ov't at 4^h A.M.
 29 Nearly cl'r from 9 $\frac{1}{2}$ ^h to 10^h; cl'y streaks low in N.: no A.B. to 10^h.
 30 Ov't. Obs. impos. to 10^h, and d's all night. Rain during night.
- July 1 Ov't and misty. Obs. impos. to 10^h, and doubtless all night.
 2 Mostly clear. Moon. No A.B. seen to 10^h.
 3 Mostly ov't to 11^h at least. Obs. nearly or quite impos.
 4 Ov't; somewhat misty. Obs. impos. to 1^h A. M. of 5th.
 5 M'y ov't: broken cl'ds bet'n 9^h and 10^h: moon: obs. n'y impos. to 9 $\frac{1}{2}$ ^h.
 6 Ov't. Obs. impos. to 10^h, and probably most of the night.
 7 Clear. Moon. No A.B. seen to 9 $\frac{3}{4}$ ^h.
 8 Clear, but hazy. Moon. No A.B. seen to 10^h, but obs. nec'y unc.
 9 Much haze and many cirri in N.: moon: no A.B. seen to 10^h.^{*}
 10 Clear. Moon. No A.B. seen to 10^h.
 11 Ov't; thunder shower 8^h to 10^h. Obs. impos. to 10^h, and p. all n't.
 12 Very clear. No A.B. seen to 10^h.
 13 Mostly clear. No A.B. seen to 9 $\frac{3}{4}$ ^h. Clouds in N. embarrass obs.
 14 Clear. No A.B. to 10 $\frac{1}{2}$ ^h.^{*} [tible about the N.
 15 Clear. No A.B. to 10 $\frac{1}{2}$ ^h, but a luminous streakiness, hardly percep-
 16 Clear. No A.B. to 9 $\frac{1}{2}$ ^h. [F. B.]
 17 Ov't. Obs. impos. to 10^h, and doubtless all night.
 18 Ov't. Obs. impos. to 10 $\frac{1}{4}$ ^h, and doubtless all night.
 19 Ov't. Obs. impos. to 10^h, and p. all n't: cl'r spots in N.E. about 10^h.
 20 Clear. No A.B. to 10 $\frac{1}{2}$ ^h.
 21 Ov't. Obs. impos. to 10^h, and doubtless all night.
 22 Ov't. Obs. impos. to 10 $\frac{1}{2}$ ^h, and p. all night. Rain during night.
 23 Very clear. A.B. slightly suspected to 10^h.
 24 Ov't; shower about 9^h. Obs. impos. to 10^h, and prob. much later.
 25 Nearly ov't.^{*}
 26 Ov't. Obs. impos. to 9^h, and doubtless all night.
 27 Much embarrassed by clouds: at 9 $\frac{1}{2}$ ^h too much cl'ded in N. for obs.
 28 Too cloudy for satisfactory obs. Moon. No A.B. seen to 10^h.
 29 Mostly cloudy to 9^h. About 9^h clearing but still hazy. Moon.
 30 M'y cl'y: moon: obs. very much embarrassed: no A.B. seen to 10^h.
 31 Ov't to 9 $\frac{1}{2}$ ^h. Moon. At 11^h partly clear, and no A.B.
- Aug. 1 Ov't. Obs. impos. to 9 $\frac{1}{2}$ ^h, and probably all night.
 2 Clear: moon: no A.B. at 9 $\frac{1}{2}$ ^h: at 2^h and at 3^h A.M. clear: no A.B.
 3 Sky embarrassed by haziness and small cl'ds: moon: no A.B. to 10^h.

July 9th.—Any moderate display could not have been seen.

July 14th.—A.B. seen in Rutland, Vt., at 10^h, by Mr. Wm. G. Hooker. Streamers. (?)

July 25th.—Possibly a faint light in N. between 9^h and 10^h, but probably due to contrast with clouds in that region.

1846.

- Aug. 4 Clear, but somewhat hazy. Moon. No A.B. seen to $9\frac{1}{2}^h$.
 5 Clear, slight haze. Moon. No A.B. seen to $9\frac{1}{4}^h$.
 6 Ov't to $9\frac{3}{4}^h$, and probably much later. Obs. impos.
 7 Nearly ov't. Obs. impos. to 9^h , and probably later.
 8 Ov't; copious rain: obs. impos. to $9\frac{1}{2}^h$, and d's all n't: ov't at 3^h A.M.
 9 Ov't; much rain during the night. Obs. impos. all night.
 10 Ov't to 10^h or later: at 12^h and to 2^h A.M. no A.B. seen: moon.
 11 Splendidly clear. A.B., seen first about $8\frac{3}{4}^h$.* (271)
 12 Clear. Slight A.B. from 9^h to 10^h .* (272)
 13 Clear, but somewhat hazy in N. No A.B. seen to 10^h : obs. imperf.
 14 Mostly clear. No A.B. seen to 10^h .
 15 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 16 Clear. No A.B. to $9\frac{3}{4}^h$. A little cloudiness about the N. horizon.
 17 Ov't to $9\frac{1}{2}^h$, and prob. much later: obs. impos. to $9\frac{1}{2}^h$ at least.
 18 Mostly clear. No A.B. seen to 11^h . [A.B. susp. about 12^h . (F. B.)]
 19 Clear. No A.B. to $9\frac{1}{2}^h$.
 20 Ov't to 9^h at least, and prob. all night. Obs. impos. to 9^h at least.
 21 Ov't to 9^h , and prob. all night. Ov't at 3^h A. M. Obs. impos.
 22 Ov't to 10^h , and doubtless all night. Obs. impos.
 23 Ov't to $9\frac{1}{4}^h$, and prob. all night. Obs. impos. to $9\frac{1}{4}^h$ at least.
 24 Nearly clear about the N. A.B.* (273)
 25 Ov't. Obs. impos. to 10^h , and doubtless all night.
 26 Ov't and drizzling. Obs. impos. to 10^h , and doubtless all night.
 27 Ov't. Obs. impos. to 10^h , and doubtless all night.
 28 Ov't to $9\frac{1}{2}^h$, and doubtless all night. Obs. impos.
 29 Ov't. Obs. impos. to 9^h , and doubtless all night.*
 30 Ov't to 8^h , aft. mostly clear: moon: no A.B. seen from 8^h to 9^h .*
 31 Clear. Moon. No A.B. seen to 10^h .
 Sept. 1 Clear. Moon. No A.B. seen to 10^h .
 2 Hazy. Moon. No A.B. seen to $9\frac{1}{2}^h$. Obs. necessarily uncertain.
 3 Cl'y most of ev'g, breaking away aft. 9^h : moon: no A.B. seen to $9\frac{1}{2}^h$.
 4 Considerably clouded. Moon. No A.B. seen to 10^h . Obs. unc.
 5 Mostly clear. Moon. No A.B. seen to 10^h .
 6 Clear. Moon. No A.B. seen to $9\frac{1}{2}^h$.
 7 Clear. Moon. No A.B. seen to 10^h .
 8 Ov't. Obs. impos. to 10^h at least.
 9 Clear. No A.B. to 10^h .
 10 Ov't at 8^h , at 10^h clear, and no A.B.
 11 Ov't. Obs. impos. to 10^h , and probably all night.
 12 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and d's later. Lightning during ev'g.
 13 Very clear. No A.B. to $9\frac{1}{2}^h$.
 14 Clear. No A.B. to 10^h .
 15 Clear. No A.B. to 10^h .
 16 Very clear. No A.B. to 10^h .
 17 Ov't. Obs. impos. to 10^h , and probably all night.
 18 Mostly clear. No A.B. to $9\frac{1}{2}^h$.

Aug. 11th.—Two or three streamers W. of N. At 9^h one streamer 3° or 4° high at top, continuing 5^m , succeeded by two or three others. Faint light continued to 10^h at least. No arch seen during the hour.

Aug. 12th.—Generally only a faint milkiess in N. About 10^h two or three streamers N.N.W. for a short space, and soon after a luminous spot E. of N.

Aug. 24th.—Noticed first about $8^h 25^m$, and visible at 10^h . At first a few streamers reaching up to altitude 15° , and an illumination through amplitude of 60° . Being occupied within from $8^h 30^m$ to 10^h , I could not observe. Mr. F. Bradley says the display was not very considerable.

Aug. 29th.—A.B. suspected through opening on horizon. [F. B.]

Aug. 30th.—A.B. suspected. [F. B.]

1846.

- Sept. 19 Clear. No A.B. to 10^h.
 20 Mostly clear. No A.B. to 9^h.
 21 Clear. A.B. [F. B.]* (274)
 22 Clear. Faint auroral bank. [F. B.]* (275)
 23 Clear. Auroral arch in N. horizon. [F. B.]* (276)
 24 Clear. No A.B. to 9^h.
 25 Ov't. Obs. impos. to 10^h at least.
 26 Ov't most of ev'g. At 10^h n'y cl'r from N. to N.W., and no A.B.
 27 Mostly clear. Moon. No A.B. seen to 9½^h.
 28 Clear. Moon. No A.B. seen to 10^h.
 29 Very hazy. Moon. No A.B. seen to 9¾^h, and obs. nec'y imperf.
 30 Mostly clear. Moon. No A.B. seen to 8^h.
 Oct. 1 Mostly ov't. Obs. impos. to 9½^h.
 2 Ov't. Obs. impos. to 9^h, and doubtless later.
 3 Clear. Moon. No A.B. seen to 10^h.
 4 Ov't; slight rain. Obs. impos. to 10^h, and probably all night.
 5 Ov't early in ev'g; 9^h to 10^h quite cl'r: moon: no A.B. seen to 10¼^h.
 6 Very hazy: no A.B. seen to 10^h: faint A.B. c'd not have been seen.
 7 Clear. A.B. slightly suspected to 10^h.* (277)
 8 Clear. No A.B. to 10^h. [much later.
 9 Clear to 9^h; aft. ov't: no A.B. to 9^h; after obs. impos. to 9½^h, and p.
 10 Clear. No A.B. to 10^h. [A.B. suspected by F. B.]
 11 Clear.* (278)
 12 Much cl'ded to 9^h; from 9^h to 9½^h ov't in N.: no A.B. seen to 9^h: obs.
 13 Ov't and stormy. Obs. impos. to 9½^h, and d's later. [imperf.
 14 Embarrassed by clouds. No A.B. seen to 10^h.
 15 Clear. A faint auroral light. I saw no streamers.* (279)
 16 Clear. No A.B. to 10^h.
 17 Cl'r early in ev'g; entirely ov't bet'n 9^h and 10^h: no A.B. seen to 9^h.
 18 Ov't early in evening; nearly clear at 8^h. No A.B.
 19 Clear. A.B. all the evening to 10^h at least.* (280)
 20 Mostly clear. No A.B. to 10^h. Clouds occasionally interfered.
 21 Mostly clear; after 9^h wholly so.* (281)
 22 Clear after about 7^h. Within doors from 8^h to 10^h.* (282)
 23 Ov't. Obs. nearly or quite impos. to 10^h.
 24 Clear.* (283)
 25 Clear. Moon. No A.B. seen to 8½^h.
 26 Ov't to 9^h; after partly cl'r to 11^h: no A.B. seen, and obs. n'y impos.
 27 Ov't. Obs. impos. to 10½^h, and doubtless all night.

Sept. 21st.—E. C. H. at Ashfield, Mass. Nearly overcast; strong auroral light on N. horizon, seen through the clouds.

Sept. 22d.—E. C. H. at Ashfield, Mass. Clear; slight auroral illumination from 8^h to 9^h.

Sept. 23d.—E. C. H. at Hartford, Conn., and between Springfield, Mass., and Hartford. Clear. Auroral arch perhaps 5° high, and quite bright.

Oct. 7th.—A considerable A.B. about midnight. Numerous streamers, &c., none reaching above 40°; seen by Mr. Joseph W. Bennett.

Oct. 11th.—A very faint auroral light along N. horizon, brightest between 9^h and 10^h. Observed to 10^h.

Oct. 15th.—The illumination very slight and low, but I think real. Looked also during the night, probably about 1^h A.M.; appearance the same.

Oct. 19th.—About 8^h three concentric arches, nearly complete, the vertex of the highest being about 25°; amplitude 60° more or less; very little streaming while observed. Considerable general light.

Oct. 21st.—A slight A.B. seen between 9^h and 10^h; a luminous bank, about 30° amplitude, reaching up 1° to 3°. I saw no streamers during about 15^m. Bank mostly W. of N.

Oct. 22d.—At 10^h a slight A.B. I saw no streamers. A mere faint illumination.

Oct. 24th.—Between 9^h and 10^h three or four streamers of the A.B. appeared for three or five minutes in N., reaching 5°, more or less, high. Before this, and after to 10^h, there was scarcely any general auroral light.

1846.

- Oct. 28 Ov't. Obs. impos. to 10^h. Cleared up during night. [A.B. seen.
 29 Generally clear, but cl'ds in N. to 8^h at least: moon: at 10^h cl'r: no
 30 Ov't and rainy. Obs. impos. to 10¹/₄^h, and probably later.
 31 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
- Nov. 1 Ov't. Obs. impos. to 9^h, and doubtless all night.
 2 Ov't and rainy. Obs. impos. to 10¹/₂^h, and doubtless all night.
 3 Ov't. Obs. impos. to 10^h, and doubtless all night.
 4 Ov't; breaking up during the ev'g, but obs. impos. to 10^h at least.
 5 Mostly ov't. Obs. impos. to 10^h, and doubtless all night.
 6 Almost entirely ov't. Obs. impos. to 10¹/₂^h, and probably all night.
 7 Ov't. Obs. impos. to 10^h, and doubtless all night.
 8 Ov't; obs. impos. to 9^h, and d's all night: a little rain d'g the night.
 9 Ov't. Obs. impos. to 10^h, and doubtless all night.
 10 Ov't. Obs. impos. to 10^h, and doubtless all night.
 11 Ov't. Obs. impos. to 10^h, and doubtless all night.
 12 Ov't. Obs. impos. to 10^h, and d's all night: ov't at 4^h A. M. of 13th.
 13 Ov't to ab't 8^h; 8^h to 10^h m'y cl'r, and no A.B.; cl'ded before 5^h A. M.
 14 Ov't. Obs. impos. to 10^h, and doubtless all night.
 15 Ov't. Obs. impos. to 10^h, and doubtless all night.
 16 Ov't. Obs. impos. to 10^h, and d's later: cleared off d'g the night.
 17 Partly clear. A.B. first seen about 9^h among clouds.* (284)
 18 P'y cl'r: no A.B. seen to 9¹/₂^h: at times much cl'ded, hazy all the ev'g.
 19 Ov't, r'y: obs. impos. to 9¹/₂^h, d's later: at 2^h A.M. very cl'r: no A.B.
 20 Ov't to 10^h, and obs. impos. At 2^h A. M. sky clear, and no A.B.
 21 Mostly clear. No A.B. seen to 10^h, but obs. imperfect.
 22 Ov't. Obs. impos. all night. A stormy night.
 23 Clear. Moon begins to interfere. No A.B. seen to 10¹/₂^h.
 24 Mostly clear. Moon. No A.B. seen. Within from 6¹/₂^h to 9¹/₂^h.
 25 Ov't and snowing. Obs. impos. to 10^h at least.
 26 Mostly clear. Moon. No A.B. seen to 10^h. At 10^h north ov't.
 27 Cl'y early in ev'g; at 8^h n'y cl'r: moon: hor. obsc.: no A.B. seen.
 28 Clear to about 8^h, after too cl'y in N. for obs.: moon: no A.B. seen.
 29 Ov't. Obs. impos. to 10^h at least.
 30 Ov't early: from 9^h to 10^h and aft. cl'r: moon: no A.B. seen to 11^h.
- Dec. 1 Ov't. Moon faintly shining. Obs. impos. to 10^h.
 2 Ov't and raining. Obs. impos. to 10^h, and probably all night.
 3 Clear. Moon. No A.B. seen to 10^h.
 4 Mostly clear. Moon rose about 7^h.*
 5 Cl'r early; at about 7¹/₂^h clouding up; aft. no opportunity to observe.
 6 Clear. Within most of ev'g. No A.B. to 6¹/₂^h, or from 8¹/₂^h to 9¹/₂^h.
 7 Ov't; raining. Obs. impos. to 11^h at least, and prob. all night.
 8 Ov't. Obs. impos. to 10¹/₂^h, and d's all night. Rain during night.
 9 Very clear. A.B. visible from 6^h to 10^h at least.* (285)
 10 Ov't, and snowing copiously. Obs. impos. to 10^h, and d's all night.
 11 Clear. No A.B. to 10^h.
 12 Clear. No A.B. to 10^h.
 13 Clear. No A.B. to 10^h.
 14 Clear. No A.B. to 10^h. [A.B. slightly susp. about 9¹/₂^h. (F. B.)]
 15 Clear. No A.B. to 10^h.

Nov. 17th.—At 10h and later sky clearer, and the auroral light stronger. About 50° amplitude, and 5° high, more or less, in centre.

Dec. 4th.—No A.B. to 9h, and yet between 6h and 7h suspected some unusual light, but clouds prevented certainty.

Dec. 9th.—Much of this time there was an arch of about 50° amplitude, and 5° central altitude. Many streamers about 8h, not very high, perhaps 15°.

1846.

- Dec. 16 Clear. No A.B. to $10\frac{1}{2}^h$. Becoming hazy after 9^h .
 17 Ov't; snow storm. Obs. impos. to 10^h , and doubtless all night.
 18 Ov't: obs. impos. to 10^h , d's later: bet'n 5^h and 6^h A.M. cl'r, no A.B.
 19 Mostly ov't. Obs. impos. to 10^h , and probably all night. [ov't.
 20 Cl'y to 8^h ; bet'n 8^h and 9^h clear: no A.B. to 9^h : bet'n 5^h and 6^h A.M.
 21 Clear. No A.B. to 10^h . [have been seen.
 22 Ov't to 9^h , aft. n'y cl'r: no A.B. seen to 10^h : faint display could not
 23 Clear. Moon set about 9^h .* (286)
 24 Ov't to 11^h , except from 6^h to $6\frac{1}{2}^h$; then N. obstructed: no A.B. seen.
 25 Ov't to 9^h ; 9^h to 10^h cl'ds; at 10^h n'y cl'r: moon: no A.B. seen to 10^h .
 26 Partly clear to about 7^h ; aft. ov't to 10^h at least: moon: obs. impos.
 27 Ov't early; at $8\frac{1}{2}^h$ n'y cl'r: moon: cl'd low in N.: no A.B. seen to 9^h .
 28 Ov't early; mostly cl'r after about $7\frac{1}{2}^h$: moon: no A.B. seen to 10^h .
 29 P'y cl'r; hazy: moon: no A.B. seen to $10\frac{1}{2}^h$: unfavorable time.
 30 Chiefly clear. Moon. No A.B. seen to 10^h .
 31 Ov't; drizzly. Obs. impos. to 10^h , and doubtless all night.

1847.

- Jan. 1 Cloudy, with fog. Obs. probably almost impos. to 9^h .
 2 Ov't. A.B. could not have been seen to 10^h at least.
 3 Clear. No A.B.
 4 Ov't; rainy. Obs. impos. to 11^h , and d's later: cl'r at sunrise of 5th.
 5 Clear: moon rose about 9^h : A.B. susp. before moonrise: obs. to $10\frac{1}{2}^h$.
 6 Clear. No A.B. to 10^h .
 7 Ov't and showery. Obs. impos. to 10^h at least.
 8 Clear. No A.B. to $10\frac{1}{2}^h$. [hazy: no A.B. seen then.
 9 Clear to 7^h , and no A.B.: aft. to $10\frac{1}{2}^h$ mostly ov't; at $10\frac{1}{2}^h$ clearing;
 10 Ov't and snowing. Obs. impos. to 10^h , and doubtless all night.
 11 Cl'r early; al't wh'y ov't by $7\frac{1}{2}^h$: no A.B. seen: cly to 10^h , when sky
 12 Clear. No A.B. to $10\frac{1}{2}^h$. [cleared: no A.B. then.
 13 Ov't most of ev'g; about 10^h p'y cl'r: no A.B. seen; obs. n'y impos.
 14 Ov't early part of ev'g; about $7\frac{1}{2}^h$ found sky clear: no A.B. to $10\frac{1}{2}^h$.
 15 Ov't to 10^h , and doubtless all night.
 16 Cl'y most of ev'g: obs. impos. to 9^h at least; at 10^h clear: no A.B.
 17 Very clear. No A.B. certainly seen to 9^h , but yet slightly susp.
 18 Ov't and raining. Obs. impos. to 11^h , and doubtless all night.
 19 M'y ov't; at 10^h generally cl'r, but a cl'd in N.: obs. n'y impos. to 10^h .
 20 Mostly ov't. Moon begins to interf. Obs. impos. to 10^h at least.
 21 Ov't early part of ev'g; clearing about 7^h , and cl'r to 10^h at least.*
 22 M'y cl'r: moon: no A.B. seen to 11^h : about 11^h al't entirely ov't.
 23 Very hazy. Moon. No A.B. seen to 10^h , and obs. nearly impos.
 24 Hazy. Moon. Obs. nearly impos. No A.B. seen to 10^h .
 25 Clear early: moon: no A.B. seen: within $6\frac{1}{2}^h$ to 10^h : at 10^h ov't.
 26 Ov't; some rain. Obs. impos. to 10^h .
 27 Clear. Moon. No A.B. to 10^h .
 28 Nearly clear. Moon. No A.B. seen to $10\frac{1}{2}^h$.
 29 Ov't and raining. Obs. impos. to 11^h , and doubtless all night.
 30 Too cloudy for obs. to $8\frac{1}{2}^h$, and probably later.
 31 About half clear. Moon. Flying clouds. No A.B. seen to 10^h .
 Feb. 1 Ov't. Obs. impos. to 10^h , and doubtless all night.
 2 Ov't. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night. Rain in night.
 3 Stormy to 7^h ; at 8^h clear: no A.B. seen to 10^h : moon rose about 9^h .
 4 Mostly clear. No A.B. to $10\frac{1}{2}^h$.

Dec. 23d.—A.B., but not detected until about 10^h . Very little illumination on horizon; a few streamers seen, one about 10° high at top.

Jan. 21st.—Moon. No A.B. seen to 10^h , yet somewhat suspected.

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- Feb. 5 Generally clear. No A.B. to 9^h. At 11^h ov't.
- 6 Clear. A.B. suspected at various times during the evening.* (287)
- 7 Hazy. A.B. slightly suspected. Ov't at 9^h. [and p. all night.
- 8 Clear early in ev'g: no A.B. to 8^h: at 8^h ov't; continued so to 10^h,
- 9 Ov't to 10^h, and doubtless all night.
- 10 Ov't to 10^h. Sky clearing up soon after 10^h, and then no A.B.
- 11 Ov't most of ev'g; about 10^h sky tolerably clear: no A.B. then.
- 12 Clear. No A.B. to 10^h.
- 13 Ov't to about 9^h; after that mostly clear to 10^h, and no A.B.
- 14 Clear. No A.B. to 10^h.
- 15 Mostly clear. No A.B. to 10^h.
- 16 Ov't; sleet and snow falling. Obs. impos. to 10¹/₂^h, and d's all night.
- 17 Hazy, and gradually becoming denser: at 9^h and after, obs. impos.:
- 18 Ov't. Obs. impos. to 11^h, and d's all night. [no A.B. seen to 9^h.
- 19 Mostly ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
- 20 Ov't. Obs. impos. to 11^h, and doubtless all night.
- 21 Ov't; sleet oc'y falling. Obs. impos. to 9¹/₂^h, and d's all night.
- 22 Ov't; snowing most of ev'g. Obs. impos. to 11^h, and p. all night.
- 23 Clear. Moon. No A.B. seen to 9^h. [None to 12^h by F. B.]
- 24 P'y cl'r to 8^h: moon: no A.B. seen: obs. n'y impos.: after 8^h ov't;
- 25 M'y cl'r to 7¹/₂^h: moon: ov't to 9^h; cl'r to 10^h: no A.B. seen: at 4¹/₂^h
- 26 Ov't: obs. impos. to 10³/₄^h, d's all n't. [to 5^h A.M. very cl'r: no A.B.
- 27 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
- 28 Mostly clear. Moon. No A.B. seen to 10^h.
- March 1 Very hazy. Moon. Obs. nearly impos. to 10^h. No A.B. seen.
- 2 Clear. Moon. No A.B. seen to 10¹/₂^h.
- 3 Ov't. Obs. impos. to 10^h, and doubtless all night.
- 4 Hazy. Moon rose about 9^h. No A.B. seen to 10^h.
- 5 Clear. No A.B. to 11^h.
- 6 Clear. No A.B. to 9^h.
- 7 Ov't; slight rain. Obs. impos. to 10^h, and doubtless all night.
- 8 Very clear. A.B.* (288)
- 9 Ov't. Obs. impos. to 10^h, and doubtless all night.
- 10 Clear. No A.B. to 10^h.*
- 11 Ov't. Obs. impos to 10^h at least.* [about 10^h.
- 12 M'y ov't: obs. n'y or quite impos. to 10^h, p. all n't: cl'r space in N.W.
- 13 Clear. No A.B. to 10^h.
- 14 Clear. No A.B. to 9^h.
- 15 Clear. No A.B. to 10¹/₂^h.
- 16 Clear. No A.B. to 11^h.
- 17 Clear. No A.B. to 10^h. About 10^h slightly suspected.
- 18 Ov't to 8^h at least. At 10^h found it clear. No A.B. then, or to 10¹/₂^h.
- 19 Clear. Grand A.B. (289)
- 20 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
- 21 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
- 22 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
- 23 Ov't and raining. Obs. impos. to 11^h, and doubtless all night.
- 24 Clear. Moon. No A.B. seen to 11^h.
- 25 M'y cl'r to 8^h: moon: no A.B. seen; ov't at 9¹/₂^h, and to 11^h at least.

Feb. 6th.—Merely a very faint light along N. horizon, and perhaps not auroral.

March 8th.—Northern horizon slightly illumined most of evening, through amplitude of 30° to 45°. A few streamers occasionally.

March 10th.—Occasionally a slight suspicion of some unusual light.

March 11th.—About 10^h 45^m clouds breaking away in N.W. and N. Suspected some auroral light, but doubtful.

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- Mar. 26 Ov't and raining. Obs. impos. to 11^h, and doubtless all night.
 27 Ov't. Obs. impos. to 10 $\frac{1}{2}$ ^h at least.
 28 Clear. Moon. No A.B. to 8^h. At 10^h clouds in N. and N.E.
 29 Hazy. Moon. No A.B. seen to 10 $\frac{1}{2}$ ^h.
 30 Ov't. Obs. impos. to 10 $\frac{1}{2}$ ^h, and doubtless all night. [no A.B.
 31 Clear early: moon: no A.B. to 8^h: 8^h to 10^h m'y ov't; at 10 $\frac{1}{2}$ ^h clear:
- April 1 Mostly cl'r to about 8^h: aft. too hazy and cl'y for obs. to 11^h at least.
 2 Clear; hazy around hor.: moon rose about 8 $\frac{1}{2}$ ^h: no A.B. seen to 11^h.
 3 Partly clear; flying clouds. No A.B. seen to 10^h.
 4 Mostly clear to 7^h. At 9^h mostly ov't. Obs. impos. from 9^h to 10^h.
 5 Mostly clear. No A.B. to 10 $\frac{1}{2}$ ^h.
 6 Ov't and raining. Obs. impos. to 10 $\frac{1}{2}$ ^h, and probably all night.
 7 Very clear. A fine general A.B.* (290)
 8 Ov't: obs. impos. to 11^h, and d's all n't: some rain during the night.
 9 Clear. No A.B. to 11^h.
 10 Clear. No A.B. to 10^h. Did not observe in person.
 11 Clear. No A.B. to 9^h.
 12 Ov't: about 11^h p'y cl'r in S., and around zenith: obs. impos. to 11^h.
 13 Clear. No A.B. to 11^h.
 14 Clear. No A.B. to 11^h.
 15 Ov't. Obs. impos. to 10 $\frac{1}{2}$ ^h at least.* [impos. to 10 $\frac{1}{4}$ ^h.
 16 N'y cl'r to 8 $\frac{1}{4}$ ^h; at 8 $\frac{1}{2}$ ^h ov't, m'y so to 10 $\frac{1}{4}$ ^h: no A.B. to 8 $\frac{1}{4}$ ^h: aft. obs.
 17 Ov't and rainy. Obs. impos. to 10 $\frac{1}{2}$ ^h, and doubtless much later.
 18 Clear: moon begins to interf.: no A.B. seen to 10^h, but som't susp.
 19 Ov't to 9 $\frac{1}{2}$ ^h; obs. impos.; 9 $\frac{1}{2}$ ^h to 10 $\frac{3}{4}$ ^h n'y cl'r: moon: no A.B. seen.
 20 Ov't to 11^h at least, and obs. impos. all night.
 21 Ov't. Obs. impos. to 10 $\frac{1}{4}$ ^h at least, and doubtless much later.
 22 Mostly ov't. Obs. impos. or nearly so to 10^h.
 23 Ov't to 10^h. Obs. impos.
 24 Clear. Moon. No A.B. seen to 11^h.
 25 Clear. Moon. No A.B. seen to 10^h.
 26 Ov't. Obs. impos. to 10 $\frac{1}{2}$ ^h at least.
 27 Clear. Moon. No A.B. seen to 10 $\frac{1}{4}$ ^h.
 28 Much obsc. by cirri: moon: no A.B. seen to 10 $\frac{1}{2}$ ^h; obs. n'y impos.
 29 Ov't. Obs. impos. to 10^h, and doubtless later. [n'y so to 10 $\frac{1}{4}$ ^h.
 30 Ov't to 10^h, then n'y cl'r, except in N.: moon: obs. impos. to 10^h, and
- May 1 Ov't. Obs. impos. to 11^h, and doubtless all night.
 2 Ov't. Obs. impos. to 9^h, and doubtless all night.
 3 Nearly clear. No A.B. to 9 $\frac{1}{4}$ ^h.
 4 Mostly cloudy. No A.B. at 9^h.
 5 Mostly clear, but hazy. No A.B. to 9 $\frac{3}{4}$ ^h.
 6 Clear. No A.B. to 11^h.
 7 Ov't. Obs. impos. to 10^h, and doubtless all night.
 8 Ov't. Obs. nearly impos. to 9 $\frac{1}{2}$ ^h, and doubtless all night.*
 9 N'y ov't: about 9^h some large stars vis.: obs. impos. to 10^h, p. all n't.
 10 Nearly clear, although somewhat hazy. No A.B. to 9 $\frac{1}{2}$ ^h.
 11 Mostly ov't. Obs. nearly impos. to 9 $\frac{1}{2}$ ^h at least. No A.B. seen.
 12 Ov't. Obs. impos. to 10^h, and doubtless all night.

April 7th.—Numerous streamers and red tints. About 10h a zone, 2° to 7° broad, spanning the heavens from E. to W. Auroral waves at intervals from 10h to 11h 30m.

April 15th.—About 10h 30m the N. seemed much lighter than other parts of the sky. Was there A.B. behind? At 12h 10m sky mostly overcast, but a long narrow opening on N.W. horizon. No A.B. visible then.

May 8th.—Between 8h and 9h some unusual light suspected along N. horizon, through either a narrow opening, or a thinner region in the clouds.

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- May 13 Ov't. Obs. impos. to 9^h, and probably all night.
 14 Mostly ov't to about 9^h; 9^h to 10^h mostly clear. No A.B. to 10^h.
 15 Clear. A.B., a slight display.* (291)
 16 Clear, though somewhat hazy. No A.B. to 10^h.
 17 Cloudless nearly, yet hazy. No A.B. to 9¹/₂^h.
 18 Ov't. About 9^h was a streak of light along N. horizon.*
 19 Mostly clear: no A.B. seen to 10^h: moon interf. [have been seen.
 20 Cl'ss, but very dusty: moon: no A.B. seen to 9³/₄^h; faint A.B. c'd not
 21 Very hazy and dusty: moon: no A.B. seen to 9¹/₂^h; obs. n'y impos.
 22 Ov't. Obs. impos. to 9^h, and doubtless all night.
 23 Ov't. Obs. impos. to 9¹/₂^h, and doubtless all night.
 24 Ov't. Obs. impos. to 9^h, and probably much later.
 25 M'y ov't to 9^h, obs. to 9^h impos.: moon: ab't 9^h cl'ds breaking in N.
 26 M'y ov't, thin cl'ds: moon: obs. n'y impos.: no A.B. seen to 10^h.
 27 Ov't to 9^h, and doubtless much later. Obs. impos.
 28 Clear. Full moon. No A.B. seen to 10^h.
 29 Ov't. Obs. impos. to 9¹/₂^h, and probably much later.
 30 Sky filled with cirri. Moon. No A.B. seen to 9¹/₄^h; obs. n'y impos.
 31 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
- June 1 Ov't and drizzle. Obs. impos. to 10¹/₂^h, and probably all night.
 2 Clear but hazy. No A.B. to 10^h.
 3 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 4 Nearly ov't. Obs. impos. to 9¹/₂^h, and doubtless later.
 5 Clear, yet hazy. No A.B. to 10^h.
 6 Clear. No A.B. to 10^h.
 7 Cloudless, but hazy. No A.B. to 10^h.
 8 Ov't. Obs. impos. to 10^h, and doubtless all night.
 9 Mostly clear. No A.B. to 9¹/₂^h.
 10 Ov't to 9¹/₂^h. At 9³/₄^h clear. No A.B. to 10^h.
 11 Ov't, drizzling. Obs. impos. to 10^h, and doubtless much later.
 12 Clear. A.B.* (292)
 13 Ov't. Obs. impos. to 9¹/₂^h, and doubtless all night.
 14 Ov't to about 9¹/₂^h; after that partly clear to 10¹/₂^h.*
 15 Clear. No A.B. to 10¹/₂^h.
 16 Clear. No A.B. to 10¹/₂^h. Some clouds about the horizon.
 17 Clear. Moon. No A.B. to 10^h.
 18 Mostly cl'y to 9¹/₂^h. Moon: clearing up in N. at 9³/₄^h: no A.B. seen.
 19 Ov't. Obs. impos. to 10^h, and doubtless all night.
 20 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 21 Mostly ov't with thick haze: moon: obs. impos. to 10^h, p. all night.
 22 Ov't. Obs. impos. to 10^h, and probably all night.
 23 Mostly clear. Moon. No A.B. seen to 10^h.
 24 Clear. Moon. No A.B. to 9¹/₂^h.
 25 Clear. Moon. No A.B. seen to 10^h.
 26 Clear. Moon. No A.B. seen at 11^h. Within from 9^h to 11^h.
 27 Mostly clear. Moon. No A.B. seen to 9¹/₄^h.
 28 Mostly ov't. Moon. Obs. impos. to 9¹/₂^h, and prob. all night.

May 15th.—First seen about 8h 45m before end of twilight. An arc 1° or 2° wide, amplitude about 80°, altitude at vertex 7° or 8°, with occasional dim streamers, reaching up to altitude from 5° to 25°. Watched till about 9h 45m. [At 2h A.M. of 16th were seen some much larger streamers. Hon. A. N. Skinner.]

May 18th.—Perhaps due to the moonlight. A.B. suspected.

June 12th.—A bow about 5° high at vertex; amplitude about 50°, with occasional ill-defined streamers, none over about 40° in altitude. Observed from 8h 45m to 11h.

June 14th.—Clouds obscured N. horizon and region. Some unusual light suspected, but could not be determined.

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- June 29 Ov't and rainy. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 30 Clear. Moon. No A.B. seen to 10^h .
 July 1 Clear. No A.B. to 10^h . Moon rose about 10^h .
 2 Ov't. Obs. impos. to 11^h at least.
 3 Clear, but somewhat hazy. No A.B. to $10\frac{1}{2}^h$.
 4 Clear. No A.B. to 10^h .
 5 Clear, but hazy about horizon.
 6 Very hazy. No A.B. seen to 10^h . Obs. much impaired.
 7 Very hazy. No A.B. seen to 10^h , but obs. nearly impos.
 8 Very hazy. No A.B. seen to 10^h , but obs. nearly impos.
 9 Very hazy.* (293)
 10 Ov't to 10^h . (?)
 11 Mostly ov't, but nearly clear a short time, about $9\frac{3}{4}^h$.* (294)
 12 Much cl'ded; oc'l cl'r spaces: no A.B. seen to $10\frac{1}{2}^h$; obs. nec'y imp.
 13 M'y ov't: obs. al't impos. to 10^h , and p. all n't: no A.B. seen to 10^h .
 14 Clear. No A.B. to 10^h .
 15 Mostly clear. No A.B. to $10\frac{1}{2}^h$.
 16 Mostly clear. No A.B. to $10\frac{1}{2}^h$.
 17 Hazy. No A.B. to 10^h .
 18 Hazy. Moon begins to interfere. No A.B. to $9\frac{3}{4}^h$.
 19 Clear. Moon. No A.B. seen to $9^h 50^m$.
 20 Clear. Moon. No A.B. seen to $10\frac{1}{4}^h$.
 21 Ov't. Obs. impos. to 10^h .
 22 Ov't and raining. Obs. impos. to 10^h at least.*
 23 Mostly cl'r; many cirri embarrass obs.: moon: no A.B. seen to 10^h .
 24 Same as 23d. Sky less favorable. Moon. No A.B. seen to 10^h .
 25 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 26 Ov't. Obs. impos. to 10^h , and doubtless much later.
 27 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless later.
 28 Clear. Moon. No A.B. to $9^h 50^m$.
 29 Clear. Moon. No A.B. seen; poor obs. [No A.B. to 11^h . (F. B.)]
 30 Ov't and rainy. Obs. impos. to 9^h , and doubtless all night.
 31 Clear. No A.B. to 10^h .
 Aug. 1 Ov't. Obs. impos. to 9^h , and probably all night.
 2 Mostly clear. No A.B. to 10^h .
 3 Ov't to about 9^h . Between 9^h and 10^h clearing off.*
 4 Clear. A.B. all the evening.* (295)
 5 Ov't. Obs. impos. to 9^h , and doubtless all night.
 6 Ov't and rainy. Obs. impos. to 10^h , and doubtless all night.
 7 Ov't and rainy. Obs. impos. to 9^h , and doubtless all night.
 8 Ov't and rainy. Obs. impos. to 9^h , and doubtless all night.
 9 Ov't and drizzling all night. Obs. impos.
 10 Ov't. Obs. impos. to 10^h , and all night.
 11 Clear chiefly to $9\frac{1}{2}^h$: no A.B.: after 10^h ov't to 11^h , and d's all n't.
 12 Clear. No A.B. to 9^h . Ov't at 3^h A. M. of 13th.
 13 Mostly ov't. Obs. nearly or quite impos. to 10^h . No A.B. seen.
 14 Mostly clear; some clouds about N. horizon. No A.B. to 11^h .

July 9th.—Auroral bow, about $9^h 30^m$ for fifteen minutes. No traces of A.B. in north.

July 11th.—Slight A.B. then visible, embarrassed by clouds. A few streamers reaching up about 25° , and a little general illumination. At 10^h overcast.

July 22d.—Suspected A.B., as the N. seemed lighter than the sky generally. Perhaps the clouds there thinner.

Aug. 3d.—By $9^h 30^m$ beautifully clear. No A.B. to $9^h 45^m$. [At $10^h 30^m$ suspected slight A.B. east of north. (F. B.)]

Aug. 4th.—Numerous bows or arches, not very well defined, in N. heavens, of 90° and more amplitude.

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- Aug. 15 Clear. No A.B. to 10^h.
 16 Mostly clear; some clouds about N. horizon. No A.B. to 10^h.
 17 Ov't. Obs. impos. to 10¹/₂^h, and probably all night.
 18 Clear. No A.B. to 10¹/₂^h.
 19 Clear. Moon. No A.B. seen to 10^h.
 20 Partly clear; clouds about N. No A.B. seen to 10^h. Obs. unc.
 21 Mostly clear. Moon. No A.B. seen to 10^h.
 22 Clear. Moon. No A.B. seen to 9^h 20^m.
 23 Mostly clear. Moon. No A.B. seen to 10^h.
 24 Clear. Moon. No A.B. seen to 10^h.
 25 Mostly ov't. Moon. Obs. impos. to 9¹/₂^h.
 26 Mostly clear. Moon. No A.B. seen to 9¹/₄^h.
 27 Ov't; showery after 9^h. Obs. impos. to 9¹/₂^h, and d's all night.
 28 Ov't. Obs. impos. to 9¹/₂^h, and doubtless all night.
 29 Clear. No A.B. to 9¹/₂^h. Moon rose about 9^h.
 30 N. much obscured from 8¹/₂^h to 11^h. No A.B. seen.
 31 Ov't and showery to 11^h. Obs. impos. [F. B.]
- Sept. 1 E. C. H. at Cambridge, Mass. Sky ov't to 9¹/₂^h, and p. all night.
 2 Nearly clear. No A.B. to 10^h. [F. B.] E.C.H. at Cambridge, Mass.
 3 Ov't to 10^h, obs. impos. [F. B.] At Cambridge, Mass., m'y cl'r: no
 4 Clear. No A.B. to 8¹/₂^h. [Nor to 10^h. (F. B.)] [A.B. to 9^h.
 5 Mostly cl'r; N. at times embarrassed by cl'ds: no A.B. seen to 9¹/₂^h.
 6 Mostly clear. No A.B. to 9¹/₂^h.
 7 Ov't. Obs. impos. to 10¹/₂^h, and probably all night.
 8 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 9 Ov't and rainy. Obs. impos. to 11^h, and doubtless all night.
 10 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 11 Mostly ov't, wholly so at 9^h, and after to 10¹/₂^h. No A.B. seen to 9^h.
 12 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 13 Clear early in evening.* (296)
 14 Beautifully clear. No A.B. to 10^h.
 15 Beautifully clear. No A.B. to 9¹/₂^h.
 16 Clear. Moon. Slight A.B.* (297)
 17 Clear. Moon. No A.B. seen to 10^h.
 18 P'y cl'r to 9^h: moon: no A.B. seen: at 9^h ov't, and to 10^h at least.
 19 Ov't. Obs. impos. to 9^h, and doubtless all night.
 20 Mostly ov't. Moon. Obs. impos. to 10^h.
 21 Clear. Moon. No A.B. seen to 10¹/₂^h.
 22 Clear. Moon. No A.B. seen to 10^h.
 23 Mostly clear. Moon. No A.B. seen to 10^h: at 10^h sky much cl'ded.
 24 Ov't and rainy. Obs. impos. to 10¹/₂^h, and doubtless all night.
 25 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 26 Ov't and rainy. Obs. impos. to 9^h, and doubtless all night.
 27 Ov't. Obs. impos. to 9¹/₂^h, and doubtless all night.
 28 M'y cl'r: no A.B. seen to 10^h: moon rose about 9^h: A.B. suspected.
 29 Clear. A.B.* (298)
 30 Clear. No A.B. to 10^h.

Aug. 21st.—A narrow nebulous streak, perhaps auroral, 9^h 45^m to 10^h, a little S. of zenith, running from W. to E. [F. B.]

Sept. 13th.—Slight A.B., soon obscured by clouds. About 9^h and after, overcast to 10^h. I saw no streamers, but a moderate illumination only. [From 11^h 30^m to 12^h nearly clear, and several streamers visible, some 20° high. (Mr. William M. Smith.)]

Sept. 16th.—Streamers 7° to 10° high, about 8^h 15^m. [F. B.]

Sept. 29th.—First seen about 7^h 30^m, an arc about 10° at vertex, and 70° or 80° amplitude. At 8^h a considerable outbreak of streamers, some reaching 70° or 80° high. In the N.W. a red patch with streamers. After 8^h 20^m to 10^h very little auroral light.

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- Oct. 1 Clear. No A.B. to 10^h.
 2 Clear. No A.B. to 10^h.
 3 Clear. No A.B. to 9¹/₂^h.
 4 Mostly clear. No A.B. to 10¹/₄^h.
 5 Mostly clear. At 10^h the N. much obscured. No A.B. to 10^h.
 6 Clear. No A.B. to 11^h.
 7 M'y ov't: obs. n'y impos. to 11^h at least, and p. all n't: no A.B. seen.
 8 Ov't and raining. Obs. impos. to 8^h, and doubtless all night.
 9 Mostly clear to 10^h. No A.B. to 10^h. At 10^h nearly ov't.
 10 Ov't early part of evening: after 8^h mostly clear: no A.B. to 9^h.
 11 Clear. No A.B. to 10¹/₂^h.
 12 Ov't and rainy. Obs. impos. to 10¹/₂^h, and doubtless all night.
 13 Mostly ov't. Moon.*
 14 Mostly clear. Moon. No A.B. seen to 10¹/₄^h.
 15 Clear. Moon. No A.B. seen to 10^h. [A.B. suspected by F. B.]
 16 Mostly clear. Moon. No A.B. seen to 10^h.
 17 Clear. Moon. No A.B. seen to 9¹/₂^h.
 18 Clear. Moon. No A.B. seen to 10^h.
 19 Ov't. Obs. impos. to 11^h, and doubtless all night.*
 20 Clear. Moon. No A.B. seen to 10^h.
 21 Ov't. Obs. impos. to 10^h, and doubtless later.
 22 Mostly ov't. Moon. Obs. impos. or n'y so, to 10¹/₄^h, and p. all night.
 23 Ov't. Obs. impos.
 24 Ov't and rainy. Obs. impos. to 9^h, and doubtless all night.
 25 Mostly clear. No A.B. seen to 10^h.
 26 Clear. Moon after about 7¹/₂^h. No A.B. seen to 10^h.
 27 Clear: moon aft. ab't 9^h: no A.B. seen to 9¹/₂^h: within from 7¹/₂^h to 9¹/₄^h.
 28 Clear. No A.B. seen to 10^h. Within from 7^h to 9^h.
 29 Clear, mostly. No A.B. to 10^h. Could not myself look after 7^h.
 30 Clear. No A.B. to 10^h.
 31 P'y cl'r: no A.B. seen to 9^h, when N. much obsc.: within 7^h to 8¹/₄^h.
 Nov. 1 Partly clear. A.B. all the evening.* (299)
 2 Clear. No A.B. to 10^h.
 3 M'y cl'r: no A.B. seen to 7¹/₂^h: within 7¹/₂^h to 9¹/₂^h: at 10^h much obsc. [by clouds.
 4 Clear. No A.B. to 10^h.
 5 Clear. No A.B. to 9^h.
 6 Mostly clear. No A.B. to 10¹/₂^h.
 7 Ov't. Obs. impos. to 9^h, and prob. all night. Within 7^h to 8¹/₂^h.
 8 M'y ov't: no A.B. seen to 9¹/₂^h: obs. much embarrassed by haze and
 9 M'y ov't: no A.B. seen to 10^h: at 10^h the N. ov't. [clouds.
 10 Much clouded.* (300)
 11 Mostly clear. A very faint A.B. most of the evening.* (301)
 12 Mostly ov't.* (302)

Oct. 13th.—Strongly suspected some auroral light, but could not be certain. Watched at intervals until 9h 30m.

Oct. 19th.—At Peru, Clinton Co., N. Y., Mr. Edward D. Selden saw an A.B., a fine display.

Nov. 1st.—Being occupied, could not observe much until from about 10h to 10h 30m. Up to 10h there was much general light, and not many streamers. From 10h to 10h 30m an ill-defined arch, vertex 10° high, more or less, amplitude 70°, more or less, little streaming; much general illumination. I hear that at 2h A. M. of 2d the light was very strong. [Red light seen by F. B.]

Nov. 10th.—A moderate display, but mostly concealed by clouds. A general light in N. all the evening, reaching up 10° or 15°, but I saw no streamers. I am told that at 8h there was in the W. a segment of a well-defined auroral bow, not reaching quite to zenith. Retired at 10h.

Nov. 11th.—Embarrassed by clouds lying about the N. horizon.

Nov. 12th.—A bow, probably auroral, from E. to W. (from 6h 40m to 7h 10m) moving upward or S., the sky being thinly overcast, so as to conceal the stars. No A.B. seen in N. to 10h, but too cloudy for observation.

1847.

- Nov. 13 Ov't to 10^h, and doubtless all night.
 14 Ov't mostly to 8^h, and doubtless all night.
 15 Mostly ov't. Obs. nearly or quite impos. to 10^h.
 16 Too cloudy for obs. to 10^h. Moon.
 17 P'y cl'r, but N. ov't so that obs. n'y or quite impos. to 10¹/₄^h: moon.
 18 Mostly ov't. Obs. impos. to 10^h, and d's all night: moon.
 19 M'y ov't: obs. impos. to 10¹/₂^h, except in N. about 8^h: no A.B. seen.
 20 Clear in part: moon: no A.B. to 10¹/₂^h: N. much obsc. at times.
 21 P'y cl'r; N. too cl'y for obs. to 9^h at least: moon: no A.B. seen to 9^h.
 22 Ov't. Obs. impos. to 10^h, and doubtless all night.*
 23 Mostly ov't. Obs. impos. to 10^h, and probably all night.
 24 Ov't and raining. Obs. impos. to 9¹/₂^h, and doubtless all night.
 25 Mostly clear after 7^h. A.B.* (303)
 26 Mostly ov't in the N. A.B.* (304)
 27 Ov't early in evening to about 7^h. After that mostly clear.*
 28 Ov't to 9^h, and obs. impos.: reported to me that about 10^h it was cl'r,
 29 Very clear and cold. No A.B. to 9³/₄^h. [and no A.B.
 30 Clear to 9¹/₂^h. No A.B.*
- Dec. 1 Ov't. Obs. impos. to 10^h, and doubtless all night.
 2 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 3 Ov't. Obs. impos. to 9¹/₂^h, and doubtless later.
 4 Clear. Slight A.B. A few streamers about 8³/₄^h: at 9¹/₄^h cl'y. (305)
 5 Ov't. Obs. impos. to 9^h, and probably all night.
 6 Clear. No A.B. to 10^h.
 7 Clear. No A.B. to 10^h.
 8 Clear to about 9^h. After that ov't to 10^h at least.
 9 Ov't, doubtless all night.
 10 Ov't and rainy. Obs. impos. to 10^h, and doubtless later.
 11 Clear after about 6¹/₂^h. No A.B. to 10^h.
 12 Ov't and rainy. Obs. impos. to 9^h, and probably all night.
 13 Ov't. Obs. impos. to 10¹/₄^h, and doubtless all night.
 14 Ov't. Obs. impos. to 10^h, and doubtless all night. Rain.
 15 Mostly ov't, and wholly so after 6³/₄^h.* (306)
 16 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 17 Ov't. Obs. impos. to 10^h, and probably all night.*
 18 M'y ov't. Moon. Obs. n'y or quite impos. to 10^h: no A.B. seen.
 19 Ov't. Obs. impos. to 10^h.* (307)
 20 M'y ov't: moon: no A.B. seen to 10^h; no faint A.B. could have been
 21 Ov't. Moon. Obs. impos. to 10¹/₄^h, and d's all night. [seen.
 22 Ov't early. Within from 7^h to 10^h. At 10^h clear. Moon. No A.B.
 23 Ov't. Obs. impos. to 10^h, and doubtless later.
 24 Mostly ov't. Obs. nearly impos. to 10^h, and probably all night.*

Nov. 22d.—At Peru, Clinton Co., N. Y., Mr. Edward D. Selden saw a splendid A.B. about 10^h.

Nov. 25th.—A fine rosy glow in N.N.W. from 6^h 15^m to 6^h 45^m; after that an arc of about 100° amplitude, 10° or 15° high at vertex, and some streamers.

Nov. 26th.—Much inferior to that of 25th, and greatly obstructed by clouds. A few streamers about 6^h 30^m, afterwards only a general light seen to 10^h.

Nov. 27th.—I slightly suspect a faint auroral light low along the N. horizon, but am not sure. Observed to 10^h.

Nov. 30th.—Yet occasionally I suspected a slight illumination along northern horizon. At 10^h overcast.

Dec. 15th.—About 6^h 15^m saw a patch of red light in N.N.E. which was probably auroral, and after, before the sky became overcast, thought I saw other unusual light.

Dec. 17th.—In Europe, A.B. seen Dec. 17th, at 7^h P.M. *L'Institut*, Dec. 22d, 1847.

Dec. 19th.—At 5^h 30^m A.M. of 20th, and doubtless earlier, a grand display of A.B. Auroral waves seen soon after 10^h of 19th, by Dr. Charles Hooker.

Dec. 24th.—A.B. slightly suspected, there being a light streak low in N. horizon. Perhaps due to opening in clouds.

1847.

- Dec. 25 Ov't and snowing. Obs. impos. to 9^h at least.
 26 Very clear. No A.B. to 10^h, and none at 5^h and 6^h A.M. of 27th.
 27 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 28 Ov't. Obs. impos. to 10^h, and doubtless later.
 29 Clear. No A.B. to 10^h.
 30 Ov't. Obs. impos. to 10^h, and doubtless all night.
 31 Ov't and foggy. Obs. impos. to 10^h, and doubtless all night.

1848.

- Jan. 1 Ov't. Obs. impos. to 10^h, and doubtless all night. Ov't in morn.
 2 M'y ov't in N. to 9^h, when chiefly clear; cl'r at 5¹/₄^h: no A.B. seen.
 3 Generally clear, but the N. much obscured.* (308)
 4 Clear. No A.B. to 9¹/₂^h.
 5 Ov't, and rainy in part. Obs. impos. to 9¹/₂^h, and doubtless later.
 6 Mostly ov't; stars vis. in zenith part of ev'g. Obs. impos. to 10^h.
 7 Mostly ov't. Obs. nearly or quite impos. to 9¹/₂^h, and p. all night.*
 8 Ov't. Obs. impos. to 10^h, and probably all night.
 9 Clear. No A.B. to 10^h. At 5³/₄^h A.M. clear, and no A.B.
 10 Clear. Moon until about 8¹/₂^h. No A.B. to 9¹/₂^h. [to 9¹/₂^h.
 11 Mostly ov't: moon: a few stars dimly seen part of ev'g: obs. impos.
 12 Clear. Moon. No A.B. seen to 9¹/₂^h.
 13 Ov't; drizzle. Obs. impos. to 9¹/₂^h, and doubtless all night.
 14 Ov't; rainy. Obs. impos. to 10^h, and doubtless all night.
 15 Ov't; rainy. Obs. impos. to 9¹/₂^h, and doubtless all night.
 16 Mostly ov't. Moon. N. tolerably clear about 9^h. No A.B. seen.*
 17 Clear. Moon. No A.B. seen to 10^h.
 18 Clear. Moon. No A.B. seen to 9¹/₂^h.
 19 Clear. Moon. No A.B. seen to 10^h.
 20 M'y cl'r, but N. embarrassed by cl'ds: no A.B. seen to 9¹/₂^h: moon.
 21 Clear. Moon. No A.B. seen to 10^h.
 22 Clear. Moon. No A.B. to 9^h. At 9^h nearly ov't.
 23 Clear. Moon rose about 8¹/₂^h.* (309)
 24 Clear. No A.B. to 10^h.
 25 Ov't. Obs. impos. to 10^h, and doubtless all night.
 26 Ov't. Obs. impos. to 10¹/₂^h, and doubtless all night.
 27 Ov't most of the evening. Clear about 10^h and after.*
 28 Almost wholly ov't. A.B. first seen about 6¹/₄^h.* (310)
 29 Clear. No A.B. to 9¹/₂^h.
 30 Ov't. Obs. impos. to 9^h, and probably all night.*
 31 Ov't. Obs. impos. to 9³/₄^h, and doubtless all night.
 Feb. 1 Clear, mostly. No A.B. to 9^h.
 2 Clear. No A.B. to 10^h. [all night.
 3 M'y cl'r early: no A.B. to 8^h: cl'y after.: obs. impos. to 10^h, and p.

Jan. 3d.—A moderate A.B., first noticed about 7^h, although the sky was before 7^h more clear. Light extended from about N. 5° E. to about N. 35° E. and about 8° to 15° high; no streamers seen; west of this clouded. Light visible in N.N.E. without much change, except as caused by clouds, to 9^h 30m, when I ceased to look.

Jan. 7th.—A light streak on N. horizon at times; possibly due to A.B., or thinness of clouds there.

Jan. 16th.—At East Hartford, Conn., an auroral display was seen before daybreak, through openings in the clouds, on the morning of the 16th, and also transiently about 8^h P.M. [Professor A. D. Stanley.]

Jan. 23d.—Apparently a faint light in N. most of the evening. Probably a slight A.B.

Jan. 27th.—Some suspicions of A.B. reported to me, but nothing positive. Did not watch.

Jan. 28th.—A strong general light along N. horizon, reaching up about 5° or more; clouds very soon came over, and by 7^h all was shut in; but before this, through openings in the clouds, a bright light appeared.

Jan. 30th.—Somewhat lighter on the N. horizon than elsewhere, occasioning slight suspicions of A.B.

1848.

- Feb. 4 Ov't, snowing and raining: obs. impos. to 10^h, and p. all n't.* (311)
 5 Mostly ov't; oc'l cl'r spaces: no A.B. seen to 10^h, and obs. n'y impos.
 6 Mostly ov't. Obs. nearly impos. to 9^h at least.
 7 Ov't to 9½^h, and obs. impos.* (312)
 8 Clear. Moon.* (313)
 9 Clear to 9^h and after: at 10^h m'y ov't: moon: no A.B. seen to 9^h.
 10 Clear. Moon. No A.B. seen to 10½^h.
 11 Clear. Moon. No A.B. seen to 10^h.
 12 Ov't. Obs. impos. to 10^h.
 13 P'y cl'r: moon and cl'ds: obs. n'y impos. to 9^h at least: no A.B. seen.
 14 Clear. Moon. No A.B. seen to 10^h.
 15 Clear. Moon. No A.B. seen to 10^h.
 16 Clear. Moon. No A.B. seen to 9¾^h.
 17 Clear. Moon. No A.B. seen to 10^h.
 18 Clear. Moon. Probably no A.B. to 9½^h, but somewhat suspected.
 19 Ov't. Moon. Obs. impos. to 9^h, and doubtless all night.
 20 Ov't. Obs. impos. to 8½^h, and doubtless later.* (314)
 21 Mostly clear. A.B. all the evening.* (315)
 22 Ov't. Obs. impos. to 10^h, and probably all night.
 23 Clear. A.B. all the evening to 10^h at least.* (316)
 24 Mostly clear after 7^h up to 10^h.* (317)
 25 Mostly clear, but a long cloud in N. interferes somewhat.*
 26 Clear. A faint A.B.* (318)
 27 M'y cl'r: no A.B.: from 5^h to 6^h A.M. cl'r: moon: no A.B. seen.
 28 Ov't and snowing. Obs. impos. to 10^h, and probably all night.
 29 Clear. No A.B. to 10^h.
 Mar. 1 Clear. No A.B. to 10^h, or possibly a faint illumination.
 2 Ov't, and snowing. Obs. impos. to 10^h, and doubtless all night.
 3 Very clear. No A.B. to 10^h.
 4 Mostly clear. No A.B. to 10^h.
 5 Clear. No A.B. to 9^h.
 6 Clear. No A.B. to 9½^h.
 7 Mostly clear. No A.B. to 10^h.
 8 Clear. No A.B. to 9^h. Moon interferes.
 9 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 10 Clear. Moon. No A.B. seen to 9½^h.
 11 Clear. Moon. No A.B. seen to 9¼^h.

Feb. 4th.—Mr. Lucius W. Fitch states that he saw an undoubted A.B. through thin and scattered clouds, before midnight.

Feb. 7th.—Between 10^h and 11^h partly clear, and a moderate A.B. I saw it but imperfectly. Some streamers. [Mr. S. D. Pardee saw about 4^h A.M. of 7th red auroral light through openings in the clouds.]

Feb. 8th.—A.B. moderate, a general light along N. horizon, perhaps 5° altitude and 80° amplitude, and at 8^h and 10^h a pretty well defined belt, low down. I saw no streamers.

Feb. 20th.—From 5^h 30^m to 6^h 12^m A.M. of 21st A.B., chiefly red. Streamers through amplitude of 90° or more, and 20° to 40° high. [At Cumberland, Md., Professor Forrest Shepherd saw, at 7^h 30^m of 20th, red auroral blushes in N. Sky clear there.]

Feb. 21st.—Up to 8^h only a bright diffuse arch-shaped bank, 10° high. After 8^h streamers 30° high, and much red light. At 10^h N. entirely overcast.

Feb. 23d.—Chiefly a light of 60° or more amplitude along N. horizon, clear and sometimes bright. Between 8^h and 9^h several bright streamers, none higher than 30°.

Feb. 24th.—A.B. not very conspicuous from 7^h to 8^h. Within from 8^h to 9^h. At 9^h and soon after, several streamers mingled with red patches; amplitude 60° to 75°, altitude 20° to 30°. At 10^h some bright streamers.

Feb. 25th.—Suspected a faint auroral light, but could not determine to 10^h. Saw at 9^h (?) what appeared to be a streamer.

Feb. 26th.—Not noticed until between 9^h and 10^h, then several faint streamers reaching up to 10° or 15°; about 10^h a diffuse light, brighter than before, but yet faint.

1848.

Mar. 12	Ov't. Obs. impos. to — ^h , and probably all night.*	
13	Mostly clear. Moon. No A.B. seen to 9 ^h .	[of ev'g.]
14	Clear. Moon. No A.B. seen to 7½ ^h , or 9½ ^h to 10 ^h .	Within most
15	Clear. Moon. No A.B. seen to 10 ^h .	Within most of evening.
16	Clear. Moon. No A.B. seen to 10 ^h .	
17	Clear, chiefly. Moon. No A.B. seen to 10 ^h .	
18	Clear. Moon. No A.B. seen to 10 ^h .	
19	Ov't. Obs. impos. to 9½ ^h , p. later: at 5 ^h A.M. cl'r: moon: no A.B.	
20	Ov't. Obs. impos. to 9 ^h , and doubtless later.	
21	Mostly clear. Moon rose about 8 ^h . No A.B. seen to 9½ ^h .	
22	Mostly ov't. Obs. impos. to 9½ ^h , and probably all night.	
23	Ov't. Obs. impos. to 10 ^h , and probably all night.	
24	Clear. A.B. moderate.*	(319)
25	Partly cloudy. No A.B. to 10 ^h . At 10 ^h ov't, and obs. impos.	
26	Ov't. Obs. impos. to 8¾ ^h , and probably all night.	
27	Ov't. Obs. impos. to 10 ^h , and probably all night.	
28	Ov't. Obs. impos. to — ^h , and doubtless all night.	
29	Clear. No A.B. to 9½ ^h or 10 ^h . Within from 7 ^h to 9 ^h .	
30	Clear. A.B. for a short time about 8 ^h .*	(320)
31	Ov't. Obs. impos. to 9½ ^h , and probably most of the night.*	
April 1	Clear. A.B., slight.*	(321)
2	Beautifully clear. A.B. moderate.*	(322)
3	Mostly cloudy. Obs. nearly or quite impos. to 10 ^h .	
4	Ov't. Obs. impos. to 10 ^h , and probably all night.	
5	Clear. No A.B. to 10 ^h .	
6	Clear. A.B.*	(323)
7	Clear. Moon. No A.B. seen to 10 ^h .*	(324)
8	Clear. Moon. No A.B. to 9½ ^h .	
9	Clear. Moon. No A.B.	
10	Clear. Moon. No A.B.	[quite impos. to 10 ^h .]
11	M'y ov't early; n'y cl'r 9 ^h to 10 ^h , except in N.: moon: obs. nearly or	
12	Ov't. Obs. impos. to 10 ^h , and doubtless all night.	
13	Clear. Moon. No A.B. seen to 9½ ^h .	
14	Mostly clear. Moon. No A.B. seen to 9½ ^h .	
15	Ov't. Obs. impos. to 9½ ^h .*	
16	Clear. Moon. No A.B. to 9¾ ^h .	
17	Mostly clear. Cirrous streaks. Moon. No A.B. seen to 10 ^h .	

March 12th.—At and after 5^h A.M. of 15th, sky overcast, clouds broken, very light along the horizon from N. to N.N.W. Suspected it to be due to A.B., but could not decide, for the clouds were too dense.

March 24th.—Not seen until after 8^h, visible to 10^h; about 80° amplitude illuminated, 5° to 8° high, and an indistinct arch. Occasional streamers. About 11^h a mass of red light in N.W., two streamers 60° high, more or less, and a distinct arch 5° or 10° high.

March 30th.—At 7^h 45^m, more or less, a general light, and a pretty definite arch from N. 25° W. to N. 55° E., about 8° or 10° high. Soon after 8^h this disappeared, and no trace of A.B. could be seen to 9^h 30^m at least. An unusual case.

March 31st.—Some suspicions of unusual light about 9^h; but perhaps due to varying thickness of clouds.

April 1st.—From 9^h to 10^h I saw only a faint light, 30° amplitude, but no streamers. [At 11^h A.B., bright. (F. B.)]

April 2d.—General light, several streamers through amplitude of 70°, more or less, some 25° high, to 10^h.

April 6th.—Not much until 9^h 30^m, when streamers appeared through amplitude of 60° or more, reaching up 40° or more, and their tops immersed in diffuse red vapor. This continued ten minutes or more, when I retired. Between 10^h and 11^h, fine display, red light, streamers 60° high, two arches 20° and 40° high, undulations. Between 2^h and 3^h A.M. of 7th, another outbreak. This time reported to me.

April 7th.—Dr. Charles Hooker informs me that about midnight the A.B. was visible; not very conspicuous, yet certain.

April 15th.—A.B. at Worcester, Mass. No details. 15th Report of Mass. State Lunatic Hospital, Dec. 1848, p. 62.

1848.

- Apr. 18 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 19 Clear. Moon. No A.B. seen to 9^h .
 20 Clear. No A.B. Moon rose about $8\frac{1}{2}^h$. No A.B. seen to $9\frac{1}{2}^h$.
 21 Clear. No A.B. to $9\frac{1}{2}^h$.
 22 Partly clouded. No A.B. to 10^h .
 23 Mostly clear. No A.B. at 9^h .
 24 Clear. No A.B. to $9\frac{3}{4}^h$. [A.B. strongly susp. about $9\frac{3}{4}^h$. (F. B.)]
 25 Partly clouded. No A.B. to $9\frac{1}{4}^h$.
 26 Ov't. Obs. impos. to 11^h .
 27 Mostly cl'r to $8\frac{1}{2}^h$: no A.B. seen: after $8\frac{1}{2}^h$ ov't to 9^h , and p. all night.
 28 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 29 Much clouded.* (325)
 30 Beautifully clear: no A.B. to $9\frac{1}{4}^h$. [A.B. slightly susp. (F. B.)]
 May 1 Ov't. Obs. impos. to $9\frac{1}{2}^h$.
 2 Ov't and rainy. Obs. impos. to 10^h , and doubtless all night.
 3 Clear. No A.B. to $9\frac{1}{2}^h$.
 4 Ov't. Obs. impos. to 10^h , and doubtless all night.
 5 Much clouded. No A.B. seen to 10^h .
 6 Clear. Moon. No A.B. seen to $10\frac{1}{2}^h$.
 7 Ov't. Obs. impos. to 9^h .
 8 Ov't. Obs. impos. to 10^h , and doubtless all night.
 9 Much clouded. Moon. No A.B. seen to 9^h , but obs. nec'y imperf.
 10 Ov't. Obs. impos. to 9^h , and doubtless all night.
 11 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and p. all night. Rain during night.
 12 Much clouded: moon: no A.B. seen 10^h to $10\frac{1}{2}^h$: within before 10^h .
 13 Ov't. Obs. impos. to 10^h , and doubtless later.
 14 Partly clouded, and obs. impeded. Moon. No A.B. seen to 10^h .
 15 Ov't. Obs. impos. to 10^h , and probably later.
 16 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night. [F. B.]
 17 Clear: moon: no A.B. to $9\frac{1}{4}^h$, and none at $3\frac{1}{2}^h$ A.M. of 18th. [F. B.]
 18 Clear. Moon.* (326)
 19 M'y cl'y: moon: obs. nearly impos.: no A.B. seen to $9\frac{1}{2}^h$. [F. B.]
 20 Mostly cloudy. Obs. nearly impos. to 10^h .
 21 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 22 Ov't. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night.
 23 Ov't. Obs. impos. to $9\frac{1}{4}^h$, and doubtless all night.
 24 Ov't. Obs. impos. to 10^h , and doubtless all night.
 25 Ov't. Obs. impos. to $10\frac{1}{4}^h$, and doubtless all night.
 26 Mostly clear. No A.B. to $9\frac{1}{2}^h$.
 27 Clear. No A.B. to $9\frac{1}{2}^h$.* (327)
 28 M'y ov't: bet'n 9^h and 10^h p'y cl'r; no A.B. then: obs. much obstr.
 29 Cl'y early in ev'g. Between 9^h and 10^h mostly cl'r. No A.B. to 10^h .
 30 M'y ov't: clear a short time about 9^h , and no A.B.: ov't $9\frac{1}{2}^h$ to 10^h .
 31 Very cloudy in N. after $9\frac{1}{4}^h$.* (328)
 June 1 Clear. No A.B. to 10^h .
 2 Clear. No A.B. to $9\frac{1}{2}^h$.

April 29th.—A.B. most of evening—a moderate strong light through amplitude of 70° , more or less, much obstructed by clouds; light perhaps 10° high. I saw no streamers to 10^h .

May 18th.—A.B. first seen about 9^h 20m, an arch 7° to 9° high, and 75° amplitude, more or less. About 9^h 45m three or four streamers, bright, E. of N. Arc unbroken at 11^h . At 12^h all gone. [F. B.] E. C. H. at Southampton; no obs.

May 27th.—About 9^h 30m Mr. F. Bradley saw a streamer, and one or two more. Very slight display.

May 31st.—A.B.; a considerable display at 9^h to 9^h 30m, much obscured by clouds. About 9^h a bright arch 5° or 8° high, and many streamers (not very bright) reaching up about 30° . After 9^h 30m clouds concealed almost all to 10^h 15m at least.

1848.

- June** 3 Mostly ov't in N. Obs. nearly or quite impos. to $9\frac{1}{2}^h$.
 4 Clear. Moon begins to interfere. No A.B. to $9\frac{1}{2}^h$.
 5 Ov't. Obs. impos. to 10^h , and probably all night.
 6 Clear. Moon. No A.B. seen to $9\frac{3}{4}^h$.
 7 Ov't: obs. impos. to 10^h . [$10\frac{1}{2}^h$ to 11^h N. n'y cl'r; no A.B. (F.B.)]
 8 Mostly clear about 9^h . Moon. No A.B. seen.
 9 M'y cl'r, but not enough so for good obs.: moon: no A.B. seen at 10^h .
 10 Mostly ov't in the N. Moon. Obs. nearly or quite impos. to 10^h .
 11 Clear. Moon. No A.B. seen to 10^h .
 12 Clear. Moon. No A.B. seen to 10^h .
 13 Clear. Moon. No A.B. seen to $9^h 20^m$.
 14 M'y cl'r to 9^h ; 9^h to 10^h much cl'ded: moon: no A.B. seen to 10^h .
 15 Clear. Moon. No A.B. seen to $9^h 20^m$.
 16 Clear. Moon. No A.B. seen at 11^h .
 17 Clear. Moon. No A.B. seen to 10^h .
 18 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 19 Ov't and raining. Obs. impos. to $10\frac{1}{2}^h$, and probably all night.
 20 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 21 Clear. No A.B. to $10\frac{1}{4}^h$.
 22 Considerably cl'ded: no A.B. seen to $10\frac{1}{2}^h$: obs. n'y impos.* (329)
 23 Ov't and rainy. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.*
 24 Clear. No A.B. to 10^h .
 25 Ov't about N., and clear elsewhere. Obs. impos. to $9\frac{3}{4}^h$.
 26 Clear. No A.B. to 10^h .
 27 Partly clear. N. obstructed below about 20° . No A.B. seen to $9\frac{3}{4}^h$.
 28 Ov't and rainy. Obs. impos. to 9^h , and doubtless all night.
 29 Mostly ov't. Obs. nearly impos. to $9\frac{3}{4}^h$. No A.B. seen.
 30 Ov't and rainy. Obs. impos. to 10^h , and doubtless all night.
July 1 Ov't and raining. Obs. impos. to 10^h , and doubtless all night.
 2 Ov't. Obs. impos. to 10^h , and doubtless all night.
 3 Clear, mostly. A faint A.B.* (330)
 4 Clear. A.B., slight, but I watched little.* (331)
 5 Clear. No A.B. at $9\frac{1}{2}^h$.
 6 Ov't. Obs. impos. to 10^h , and probably later.
 7 Ov't. Obs. impos. to 9^h , and probably most of the night.
 8 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 9 Ov't and rainy. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 10 Clear. Moon. No A.B. seen to 10^h .
 11 Partly clear. Fine A.B. from about $8\frac{3}{4}^h$ to $10\frac{1}{2}^h$. (332)
 12 Ov't. Obs. impos. to 10^h , and doubtless all night.
 13 Ov't chiefly to 10^h . Obs. impos. to 10^h , and probably all night.
 14 Mostly cl'r: moon: no A.B. to $9\frac{3}{4}^h$: n'y ov't at $10\frac{1}{2}^h$: no A.B. seen.
 15 Clear. Moon. No A.B. to $10\frac{1}{2}^h$.
 16 Clear. Moon. No A.B. to $10\frac{1}{2}^h$.
 17 Clear. Moon. No A.B. to $9\frac{1}{2}^h$. [Nor to $11\frac{1}{2}^h$. (F. B.)]
 18 Mostly clear. Moon. No A.B. seen to 10^h , but clouds impair obs.
 19 Mostly clear. Moon in part. No A.B. seen to $10\frac{1}{2}^h$.
 20 Clear. No A.B. to 10^h .
 21 Clear. No A.B. to 10^h . [N. hazy at times. (F. B.)]
 22 Mostly clear. No A.B. to 10^h .

June 21st.—A.B. slightly suspected about $10^h 30^m$. [F. B.]

June 22d.—Auroral light among clouds at $9^h 30^m$. [F. B.]

June 23d.—A.B. slightly suspected at $9^h 15^m$ through clouds, but exceedingly doubtful. [F.B.]

July 3d.—Merely a slight illumination about 10^h . I saw no streamers.

July 4th.—About 1^h A.M. of the 5th a few streamers were seen by Mr. Gurdon Evans.

1848.

- July 23 Much clouded. A.B.* (333)
 24 N. much obstructed by clouds. No A.B. seen to $9\frac{1}{4}$ h.
 25 Clear. No A.B. to $9\frac{1}{2}$ h.
 26 Ov't. Obs. impos. to $9\frac{1}{2}$ h, and probably all night.
 27 Ov't. Obs. impos. to $9\frac{1}{4}$ h, and probably all night.
 28 Mostly ov't to $9\frac{1}{2}$ h at least. Obs. nearly impos.*
 29 Ov't. Obs. impos. to $10\frac{1}{2}$ h.
 30 Very clear. No A.B. to $9\frac{1}{4}$ h. Rain in the night.
 31 Ov't. Obs. impos. to 10h, and doubtless much later.
- Aug. 1 Clear, except cloud low on N. horizon. No A.B. to $9\frac{1}{2}$ h.
 2 Very clear. No A.B. to 10h.
 3 Mostly clear. No A.B. to $9\frac{1}{4}$ h.
 4 Ov't. Obs. impos. to 11h, and doubtless all night.
 5 Clear. No A.B. to $10\frac{1}{2}$ h.
 6 Clear. Moon. No A.B. seen to 9h.
 7 Clear. Moon. No A.B. seen to $9\frac{1}{2}$ h.
 8 Clear. Moon. A.B., first noticed at $9\frac{1}{2}$ h.* (334)
 9 Mostly ov't. Moon. Obs. nearly impos. to 10h.*
 10 Clear. Moon. No A.B. seen to 10h, and none at 2h A.M. of 11th.
 11 Nearly clear. Moon. No A.B. seen to 10h.
 12 Partly clear. Moon. No A.B. seen to $10\frac{1}{2}$ h. No good obs.
 13 Mostly cl'r; cl'd low in N. and N.W.: moon: no A.B. seen to $9\frac{1}{4}$ h.
 14 Clear. Moon. No A.B. seen to 10h. Did not observe personally.
 15 Clear. Moon. No A.B. seen to $9\frac{1}{2}$ h.
 16 Ov't to 10h: obs. impos.: at $10\frac{3}{4}$ h m'y cl'r in N.: moon: no A.B. vis.
 17 Ov't, chiefly. Moon. Obs. impos. to 10h.
 18 Ov't. Obs. impos. to 10h, and doubtless all night.*
 19 Clear. No A.B. to 9h.
 20 Clear. No A.B. to 8h 50m.
 21 Ov't. Obs. impos. to $9\frac{1}{2}$ h.* (335)
 22 Clear. Suspicions of slight A.B. to $9\frac{1}{2}$ h.* (336)
 23 Much clouded to 9h, and 9h to $9\frac{1}{2}$ h ov't. No A.B. seen to 9h.
 24 Clear. No A.B. to $9\frac{1}{2}$ h.*
 25 Clear. No A.B. to $9\frac{3}{4}$ h.
 26 Clear. No A.B. to 10h.
 27 Clear. I suspect a faint auroral light about 10h. No streamers.
 28 Ov't. Obs. impos. to 10h, and probably all night.
 29 Clear. No A.B. to 10h.
 30 Clear. No A.B. to 10h.
 31 Clear. No A.B. to 10h.
- Sept. 1 Mostly clear. No A.B. to 10h. [self observe.
 2 Clear: moon begins to interfere: no A.B. seen to 10h: did not my-

July 23d.—First seen about 8h 45m. At 8h 50m a large red spot about N. 65° W.; some streamers 40° high; general white light in N. About 11h a shower of rain. [At 12h partly clear; few streamers. Mr. M. C. Weld.]

July 28th.—Slight suspicions of A.B. about 9h 30m on horizon, perhaps due to contrast of clouds.

Aug. 8th.—Several faint streamers, partly red, reaching up 40° ; no arch. At 3h A.M. of 9th, a general ruddy light in the N.

Aug. 9th.—No A.B. seen. Abroad from 1h to 3h 30m A.M., sky partly clear, and after 3h very clear. No A.B. in this period, yet about 3h 15m some suspicions of A.B. made doubtful by the dawn.

Aug. 18th.—A.B. suspected through clouds.

Aug. 21st.—At 11h A.B. seen by Mr. Joseph S. Ruth. Several streamers.

Aug. 22d.—A.B., faint but certain, seen by Mr. F. Bradley; a faint general light, and at least one streamer.

Aug. 24th.—Suspected faint auroral light from 9h to 10h. [F. B.]

1848.

Sept.	3	Clear. Moon. No A.B. to 8 ^h .*	(337)
	4	Ov't to 9 ^h , and probably later. Obs. impos.	
	5	Mostly ov't. Obs. impos. to 9 ^h .	
	6	Clear. Moon. No A.B. seen to 9 ^h .	
	7	Clear. Moon. No A.B. to 9 ^h .	
	8	Mostly ov't in N. to 9 ¹ / ₂ ^h : moon: obs. nearly or quite impos. to 9 ¹ / ₂ ^h .	
	9	Mostly clear. Moon. No A.B. seen to 9 ¹ / ₂ ^h .	
	10	Clear. Moon. No A.B. seen to 9 ¹ / ₂ ^h .	
	11	Clear. Moon. No A.B. seen to 10 ^h .	
	12	Clear. Moon. No A.B. seen to 8 ¹ / ₂ ^h .	
	13	Clear. Moon. No A.B. seen to 10 ^h .	
	14	Ov't and raining. Obs. impos. to 9 ^h , and doubtless all night.	
	15	Clear. Moon. No A.B. to 10 ^h .	
	16	Clear. No A.B. to 10 ^h .	
	17	Ov't and raining. Obs. impos. to 8 ¹ / ₂ ^h , and doubtless all night.	
	18	Clear. No A.B. to 9 ¹ / ₂ ^h .	
	19	Clear. No A.B. to 9 ^h .	
	20	Ov't. Obs. impos. to 9 ^h . At this time, clouds breaking.	
	21	Very clear. No A.B. to 9 ^h .	
	22	Partly clear. At 9 ^h ov't. No A.B. seen.	
	23	Clear. No A.B. to 9 ^h .	
	24	Mostly ov't. No A.B. seen to 9 ^h , and probably none occurred.	
	25	Mostly ov't. No A.B. seen to 10 ^h .	
	26	Clear. No A.B. to 10 ^h .	
	27	Mostly ov't. No A.B. seen to 10 ^h .	
	28	Clear to about 9 ^h , when it became wholly ov't. No A.B. to 9 ^h .	
	29	Ov't. Obs. impos. to 9 ^h , and probably all night.	
	30	Ov't. Obs. impos. to 9 ^h , and doubtless all night.	
Oct.	1	Ov't and raining. Obs. impos. to 9 ¹ / ₂ ^h , and doubtless all night.	
	2	Ov't and raining. Obs. impos. to 9 ^h , and doubtless all night.	
	3	Ov't and raining. Obs. impos. to 9 ^h , and doubtless all night.	
	4	Ov't early part of evening; at 8 ^h clearing away. No A.B. then.	
	5	Ov't to 8 ^h at least, and obs. impos.	
	6	Clear. Moon. No A.B. seen to 9 ^h .*	
	7	Clear. Moon. No A.B. seen to 8 ¹ / ₂ ^h .	
	8	Clear. Moon. Suspected a slight A.B., but uncertain to 9 ^h .	
	9	Clear. Moon. No A.B. seen to 9 ^h .	
	10	Clear. Moon. No A.B. seen to 10 ^h .	
	11	Clear. Moon. No A.B. seen to 10 ^h . Within from 7 ^h to 9 ¹ / ₄ ^h .	
	12	Clear. Moon. No A.B. seen to 10 ^h .	
	13	Mostly ov't. Moon. Obs. nearly impos. to 10 ^h , and prob. all night.	
	14	Clear. Moon. No A.B. seen to 10 ^h .	
	15	Clear. Moon rose about 8 ^h . No A.B. to 9 ^h .	
	16	Ov't. Obs. impos. to 9 ^h , and doubtless all night.	
	17	Ov't. Obs. impos. to 9 ¹ / ₂ ^h , and doubtless all night.	
	18	Ov't and rainy. Obs. impos. to 9 ^h , and doubtless all night.*	
	19	Almost wholly ov't. Some suspicions of A.B. to 9 ¹ / ₂ ^h .*	

Sept. 3d.—Dr. Chas. Hooker informs me that at midnight of 3d–4th, and at 2^h A. M. of 4th, there was a general light in N., but no streamers. He says it was an undoubted A.B.

Oct. 6th.—At Cambridge, Mass., a partial auroral belt was seen by Mr. William C. Bond, from 9^h to 10^h. It passed overhead southwardly. See *N. Y. Tribune*, Oct. 10th.

Oct. 18th.—A grand A.B., coronal, seen in England; described by Weld, *Lond., Edin. and Dub. Phil. Mag.*, Nov. 1848.

Oct. 19th.—Slight A.B. in England; described by Weld, *Phil. Mag.*, Nov. 1848. A.B. at Worcester, Mass. 16th Report Mass. Lunatic Asylum. No details.

1848.

Oct.	20	Clear latter part of evening, after about 8 ^h . No A.B. to 9 ¹ / ₂ ^h .*	
	21	Ov't. Obs. impos. to 9 ^h at least.	
	22	Clear. A.B., slight.*	(338)
	23	Clear. A.B., seen soon after 6 ^h .*	(339)
	24	Cl'y to 9 ^h : obs. impos.: bet'n 9 ^h and 10 ^h cl' red off: no A.B. to 10 ^h .	
	25	Mostly clear. A.B.*	(340)
	26	Considerably clouded.*	(341)
	27	Mostly ov't after 8 ^h : no A.B. to 8 ^h : after that obs. n'y impos. to 9 ¹ / ₂ ^h .	
	28	Very much obstructed by clouds. No A.B. seen to 9 ¹ / ₂ ^h .	
	29	Ov't and rainy. Obs. impos. to 9 ^h , and doubtless all night.	
	30	Mostly clear. No A.B. to 9 ^h .	
	31	Clear most of evening. No A.B. to 9 ^h .	
Nov.	1	Clear. No A.B. to 9 ¹ / ₄ ^h . Within most of the evening.	
	2	Clear. No A.B. to 9 ^h .	
	3	Clear. Moon interferes. No A.B. seen to 9 ^h .	
	4	Ov't and raining. Obs. impos. to 9 ¹ / ₂ ^h .	
	5	M'y cl'r: no A.B. to 9 ^h : I did not watch: at 5 ¹ / ₂ ^h A.M. cl'r: no A.B.	
	6	Mostly cl'r to 8 ^h : no A.B.: after 8 ^h N. considerably cl'ded: moon.	
	7	Clear. Moon. No A.B. to 10 ^h .	
	8	Too cloudy for obs. to 9 ¹ / ₂ ^h at least, and doubtless all night.	
	9	N. much clouded to about 9 ^h ; then clear to 10 ¹ / ₂ ^h : moon: no A.B.	
	10	Clear. Moon. No A.B. seen to 10 ¹ / ₄ ^h .	
	11	Ov't. Obs. impos. to 10 ^h .	
	12	Ov't and snowing. Obs. impos. to 9 ¹ / ₂ ^h , and doubtless all night.	
	13	Clear. No A.B. seen to 9 ^h . Moon rose about 7 ¹ / ₂ ^h .	
	14	Cl'r to about 8 ^h , no A.B.: after 8 ^h clouding, and obs. difficult to 10 ^h .	
	15	Mostly clear.*	(342)
	16	Mostly ov't. Obs. nearly or quite impos. to 9 ^h , and d's all night.	
	17	Ov't.*	(343)
	18	Much clouded. Slight A.B. at times, low on horizon.	(344)
	19	Almost wholly ov't.*	(345)
	20	Mostly clear, but some clouds about N. No A.B. to 9 ^h .	
	21	Mostly ov't.*	(346)
	22	Mostly clear to 9 ^h .*	(347)
	23	Clear. A.B. between 6 ^h and 7 ^h .*	(348)

Oct. 20th.—A.B. suspected about 8^h 50m. [F. B.] Slight A.B. in England; described by Weld, *Phil. Mag.*, Nov. 1848.

Oct. 22d.—A faint but distinct illumination along N. horizon. I saw no streamers, but did not watch long. [Between 10^h and 11^h, Mr. M. C. Weld saw a few low streamers.]

Oct. 23d.—Between 6^h and 7^h a fine display of streamers, with much red light, some 40° to 50° high, through amplitude of 60° more or less. After 7^h and to 9^h, not much display, a general light only.

Oct. 25th.—Not very conspicuous; principally after 9^h; a light low in N., occasionally a few streamers. [A red light in N. before dawn of 25th, seen by Mr. M. C. Weld.]

Oct. 26th.—A.B., slight; light low along N. horizon. I saw no streamers to 9^h.

Nov. 15th.—About 9^h a very slight A.B., a little W. of N. Most of the evening I could not see any traces of it.

Nov. 17th.—Remarkably light, now and then a red hue in the clouds, and reflected on the snow. Probably a great aurora behind. [Unwell and did not observe.] A magnificent crimson coronal A.B. seen in Maine, Western New York, &c.

Nov. 19th.—Only a small partial opening in N. Here at 9^h and after, was a light so strong that I have no doubt there was an A.B. behind. I hear that between 8^h and 9^h the light in the N. was stronger and of a red hue; sky overcast thinly.

Nov. 21st.—At times nearly clear, except in N. A pretty bright A.B. much obscured by clouds. Amplitude 75°, more or less, and height 5° to 7°, as far as could be determined. Seen from 6^h to 9^h, and no further observation.

Nov. 22d.—A slight A.B., brightest before 7^h, and gradually disappearing about 8^h. At 9^h, overcast. I saw no streamers, but only a very faint, ill-defined light, like a reflection of an A.B. below horizon.

Nov. 23d.—Several streamers, some 30° high. After 7^h, and up to 9^h, I could not be sure of the least auroral traces.

1848.

Nov. 24	Ov't and raining. Obs. impos. to 9 ^h , and doubtless most of night.	
25	Clear.*	(349)
26	Clear.*	(350)
27	Clear. A faint A.B. all the evening.*	(351)
28	Clear.*	(352)
29	Mostly clear. Moon begins to interfere.*	(353)
30	Mostly clear. Moon. No A.B. seen to 9 ^h .*	(354)
Dec. 1	Ov't. Obs. impos. to 9 ^h , and d's all night. Rain during night.	
2	Clear. Moon. No A.B. seen to 8 ^h .	
3	Mostly clear. Moon. No A.B. seen to 8½ ^h . Ov't at 4 ^h A. M.	
4	Ov't to 9 ^h at least, and obs. impos.	
5	Ov't to 10 ^h , and doubtless all night. Ov't 5 ^h to 6 ^h A.M. of 6th.	
6	Ov't to 10 ^h , and doubtless all night.	
7	Ov't to 9½ ^h , and doubtless all night.	
8	P'y cl'r before 8 ^h : moon: no A.B. seen: after that to 9 ^h N. cl'ded.	
9	Ov't. Obs. impos. to 10 ^h , and doubtless all night.	
10	Ov't. Obs. impos. to 9 ^h , and p. all night: ov't 5 ^h to 6 ^h A.M. of 11th.	
11	Al't entirely ov't: moon: obs. n'y impos. to 9 ^h at least: no A.B. seen.	
12	Clear. Moon. No A.B. seen to 9 ^h .	
13	Ov't. Obs. impos. to 9 ^h .	
14	Ov't. Obs. impos. to 9 ^h , and doubtless all night.	
15	Very clear. No A.B. to 10 ^h .	
16	Ov't and rainy. Obs. impos. to 9 ^h , and most of the night.	
17	Clear, chiefly. A.B.*	(355)
18	Clear. Before 9 ^h saw no A.B.*	(356)
19	Partly cloudy in the N. No A.B. seen to 9¼ ^h .	
20	Ov't and rainy. Obs. impos. to 9 ^h , and doubtless all night.	
21	Ov't and snowing. Obs. impos. to 10 ^h , and doubtless all night.	
22	Ov't most of ev'g; ab't 7 ^h cl'ds broke a few minutes: no A.B. seen.	
23	Clear. Occasionally some slight suspicions of A.B. to 9 ^h .*	(357)
24	Ov't. Obs. impos. to 9 ^h , and doubtless all night.	
25	Ov't. Obs. impos. to 9½ ^h . Cleared off during the night.	
26	Clear: faint auroral light in N.; saw no streamers to 9½ ^h .	(358)
27	Ov't and snowing. Obs. impos. to 10 ^h , and d's most of night.	
28	Cl'r; at 9½ ^h growing hazy: no A.B. to 9½ ^h : ov't at sunrise of 29th.	
29	Ov't and snowing. Obs. impos. to 9 ^h , and doubtless all night.	
30	Clear. Moon interferes. No A.B. seen to 10¼ ^h .	
31	Clear. Moon. No A.B. seen to 9 ^h . Within most of the evening.	

Nov. 25th.—Looking frequently from 6^h to 9^h, I saw no A.B. Within from 9^h to 10^h. At 10^h an evident A.B., a general light along N. horizon; about 10^h 20^m several streamers appeared 5° or 8° high, and bright.

Nov. 26th.—I could not discern any A.B. until after 8^h, although I had some slight suspicions of one. About 8^h 30^m a distinct A.B., general light; but I saw no streamers to 8^h 50^m.

Nov. 27th.—Merely a general light on N. horizon, of about 40° amplitude. I saw no streamers to 9^h 15^m.

Nov. 28th.—Looking at various times to 9^h, I saw no A.B.; the N. was somewhat obstructed by clouds. At 9^h 30^m, on going out, I saw a small segment of an auroral arch in N.E. Watched it till 10^h 20^m. No other auroral indications.

Nov. 29th.—A.B. suspected, but no certain traces, except a small, faint, transient auroral patch at 10^h.

Nov. 30th.—At 5^h 30^m A.M. of Dec. 1st, saw a segment of an auroral arch in N.W. until daylight interfered.

Dec. 17th.—A fine display of streamers, red and white, about 5^h 55^m, through amplitude of 60° or 70°, to an altitude of 50°. After 6^h 15^m, not much display to 9^h at least.

Dec. 18th.—Within doors from 9^h to 10^h. At 10^h found the A.B. visible, low in the N. moderately bright, amplitude about 40°, altitude not more than 5°. I saw no streamers in twenty minutes.

Dec. 23d.—A.B. general light at 9^h 30^m, saw no streamers. [F. B.]

1849.

- Jan. 1 Ov't. Obs. impos. to 10^h. From 5^h to 6^h A.M. clear, and no A.B.
 2 Clear. Moon. No A.B. seen to 9^h. No A.B. at 6^h A.M. of 3d.
 3 Clear. Moon. No A.B. seen to 10^h.
 4 Cl'y early in ev'g; after 7¹/₂^h m'y cl'r: moon: no A.B. seen to 9¹/₂^h.
 5 Mostly clear. Moon. No A.B. seen to 10^h.
 6 Very clear. Moon. No A.B. seen to 10^h.
 7 Clear. Moon. No A.B. seen to 9¹/₂^h. Within most of evening.
 8 Ov't. Obs. impos. to 9¹/₂^h, and probably all night.
 9 Ov't. Obs. impos. to 10^h. Cleared off during night.
 10 M'y cl'r, but cirri about N.: moon after 7¹/₆^h: no A.B. seen to 9^h.
 11 Clear. No A.B. to 9^h.
 12 Clear. No A.B. to 9^h.
 13 Ov't. Obs. impos. to 10^h, and probably all night.
 14 Ov't. Obs. impos. to 9^h, and probably all night.*
 15 Ov't to about 10^h.* (359)
 16 Clear. No A.B. to 10^h, but occasionally suspected.
 17 Clear. No A.B. to 10^h.
 18 Clear. No A.B. to 9¹/₂^h.
 19 Clear. No A.B. to 10^h; between 9^h and 10^h some faint suspicions.
 20 Ov't. Obs. impos. to 10^h at least. Cleared off during the night.
 21 Nearly ov't to 6¹/₂^h; ov't at 9^h and to 10^h: obs. impos.: cl'r at 6^h A.M.
 22 M'y ov't: no A.B. seen to 9¹/₂^h: [tolerably cl'r part of ev'g. (F. B.)]
 23 Clear. No A.B. to 10^h.*
 24 Ov't. Obs. impos. to 9^h, and probably all night.
 25 Ov't. Obs. impos. to 9¹/₂^h at least.
 26 Much clouded: no A.B. seen to 10^h; obs. nec'y very imperfect.
 27 Clear. No A.B. to 10¹/₂^h.
 28 Ov't. Obs. impos. to 9^h, and doubtless all night.
 29 Ov't. Obs. impos. to 9^h, and doubtless all night.*
 30 M'y ov't: obs. impos. to 10^h, and d's all n't: did not obs. personally.
 31 Cl'r to ab't 9^h, when cl'ds began to fill the sky: moon: no A.B. to 9^h.
 Feb. 1 Much obsc. by cl'ds: moon: no A.B. seen to 8^h: obs. nec'y imperf.
 2 Mostly ov't. Moon. Obs. impos. to 9¹/₂^h, and probably all night.
 3 Clear. Moon. No A.B. seen to 9^h.
 4 Partly cl'r: moon: no A.B. seen to 10^h: cl'ds interf. considerably.
 5 Much cl'ded early: moon: obs. unc.: n'y cl'r ab't 9^h, and no A.B.
 6 Snowing to ab't 8^h; at 9^h cl'ring; at 10^h very cl'r except cl'd low in
 7 Clear. Moon. No A.B. seen to 9¹/₄^h. [N.: moon: no A.B. at 10^h.
 8 Ov't. Obs. impos. to 10¹/₂^h at least.
 9 Clear most of ev'g, N. becoming cloudy about 9^h. No A.B. to 9^h.
 10 Ov't: obs. impos. to 9^h: soon after cl'ds broke, and moon rose.
 11 Ov't. Obs. impos. to 9^h, and doubtless all night.
 12 Ov't and snowing. Obs. impos. to 9^h, and probably most of night.
 13 Mostly clear.* (360)
 14 Much embarrassed by clouds. No A.B. seen to 9¹/₂^h.
 15 Clear. No A.B. to 9¹/₂^h. Within from 8¹/₄^h to 9¹/₄^h.
 16 Clear. A.B.* (361)

Jan. 14th.—N. appeared lighter than other parts, causing suspicion of A.B.

Jan. 15th.—At 10^h clouds were breaking away in the N. and revealed auroral light. I saw no streamers, but did not watch long.

Jan. 23d.—Between 9^h and 10^h I suspected the reflection of an aurora below the horizon.

Jan. 29th.—Rain in the night. About 9^h the N. horizon seemed to be lighter than other quarters, perhaps moonlight, perhaps A.B.

Feb. 13th.—A.B. faint and doubtful to 7^h 45m, when it was decided. Amplitude 70° more or less, with some streaming. I saw no streamers higher than 10°. At 9^h and after cloudy.

Feb. 16th.—Slight and uncertain until about 9^h 30m, when and after to 10^h, it was plain; but then only an illumination along N. horizon, amplitude 40°, altitude 2° or 3°. I saw no streamers.

1849.

- Feb. 17 Ov't. Obs. impos. to 9^h, and doubtless all night.
 18 Much clouded early part of evening.*
 19 Clear.* (362)
 20 Ov't. Obs. impos. to 9^h, and doubtless all night.
 21 Cl'r to ab't 8^h, then cl'ding; by 8½^h ov't, and so to 10^h: no A.B. to 8^h.
 22 Ov't and snowing. Obs. impos. to 9½^h, and probably all night.
 23 Clear.*
 24 Ov't. Obs. impos. to 9^h, and doubtless all night.
 25 Ov't. Obs. impos. to 10^h, and doubtless all night.
 26 Ov't; slight rain and sleet. Obs. impos. to 9^h, and d's all night.
 27 Ov't. Obs. impos. to 9½^h, and doubtless all night.
 28 Ov't. Obs. impos. to 10^h, and doubtless all night.
 March 1 Mostly ov't. Obs. impos. to 10^h, and probably all night.
 2 Ov't. Obs. impos. to 9½^h, and doubtless all night.
 3 Too cloudy for obs. to 9^h. At 10^h clear, and no A.B. Moon.
 4 Clear. Moon. No A.B. seen to 9^h.
 5 Clear. Moon. No A.B. seen to 10^h.
 6 Ov't. Obs. impos. to 10^h, and doubtless all night.
 7 Cl'r after 8^h or 8½^h: moon: no A.B. seen to 9½^h: cl'y early in ev'g.
 8 Clear. Moon. No A.B. seen to 10½^h.
 9 Clear. Moon. No A.B. seen to 10^h.
 10 Clear. Moon after about 8^h. No A.B. to 9^h.
 11 Clear. No A.B. to 8½^h.
 12 Ov't. Obs. impos. to 10½^h.
 13 Mostly clear. No A.B. to 9^h.
 14 Ov't. Obs. impos. to 9½^h, and doubtless all night.
 15 Ov't and raining. Obs. impos. to 11^h.
 16 Clear. No A.B. to 10½^h.
 17 Ov't. Obs. impos. to 9½^h.
 18 Clear. A.B. all the evening.* (363)
 19 Clear. Slight A.B.* (364)
 20 Ov't. Obs. impos. to 9^h, and doubtless all night. Rain.
 21 Ov't and showery. Obs. impos. to 10^h, and doubtless all night.
 22 Very clear. No A.B. to 10^h.
 23 Mostly clear, but growing cloudy about 9^h. No A.B. to 9¼^h.
 24 Mostly clear, but hazy about horizon. No A.B. to 9½^h.
 25 Ov't and raining. Obs. impos. to 9^h, and doubtless all night.
 26 Ov't and snowing. Obs. impos. to 9½^h, and doubtless all night.
 27 Ov't and raining. Obs. impos. to 9^h, and doubtless all night.
 28 Ov't. Obs. impos. to 10^h, and doubtless all night.
 29 Ov't. Obs. impos. to 9^h, and probably most of the night.
 30 Ov't. Obs. impos. to 9^h, and doubtless all night.
 31 Partly clear. Moon. No A.B. to 9½^h, but obs. nec'y imperfect.
 April 1 Very clear. Moon. No A.B. seen to 10^h.*
 2 Clear. Moon. No A.B. seen to 9½^h. [obs. impos.
 3 M'y cl'y, and ab't 9^h and after ov't: moon: no A.B. seen to 9^h; after

Feb. 18th.—A.B. then suspected. May have been due to contrast of open sky with clouds. After 8h to 9h 30m nearly clear and no A.B. From 5h to 6h A.M. of 19th clear and no A.B.

Feb. 19th.—Early part of evening, no A.B. discernible until between 7h and 8h. About 7h 40m the A.B. bright, 75° amplitude, and 10° altitude; scarcely any streamers.

Feb. 23d.—At 7h 30m and other times suspected a faint auroral light, but could not be absolutely certain. Watched to 10h.

March 18th.—An arch of about 100° amplitude, and 10° to 15° altitude at vertex, with a few streamers now and then. Visible up to midnight at least.

March 19th.—A faint light on N. horizon, visible from 7h 20m to 8h. After 8h and up to 9h, I could see no trace of it.

April 1st.—A.B. strongly suspected by F. B., but no streamers seen.

1849.

- April 4 Mostly ov't. Moon. Obs. impos. to $9\frac{1}{4}^h$, and probably all night.
 5 Clear most of evening. Moon. No A.B. seen to $9\frac{3}{4}^h$.
 6 Clear. Moon. No A.B. seen to 9^h .
 7 M'y ov't: moon: no A.B. c'd be seen; obs. n'y or quite impos. to 9^h .
 8 Within doors from 7^h to $8\frac{3}{4}^h$.
 9 Clear. No A.B. to $10\frac{1}{4}^h$. Moon after about 9^h .
 10 Ov't and raining. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night.
 11 Very clear. No A.B. to 10^h .
 12 Clear. No A.B. to $10\frac{1}{4}^h$. Growing cloudy after 9^h .
 13 Ov't: obs. impos. to $10\frac{1}{2}^h$, p. much later: cl'ds broken here and there.
 14 Mostly clear, except near N. horizon.*
 15 Clear. No A.B. to 10^h .
 16 Mostly ov't.*
 17 Clear. No A.B. from $9\frac{1}{2}^h$ to 10^h . Within the house before this.
 18 Ov't and raining. Obs. impos. to 10^h , and probably all night.
 19 Clear. No A.B. to 10^h , and none from 1^h to 2^h A.M. of 20th.
 20 Clear.*
 21 Mostly ov't, but tolerably clear after 9^h . No A.B. seen to 10^h .
 22 Clear. No A.B. to $9\frac{1}{4}^h$.
 23 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 24 Mostly clear. Within from 8^h to 10^h . No A.B. at 10^h , or to $10\frac{1}{2}^h$.
 25 Clear. Within doors from $7\frac{1}{2}^h$ to $9\frac{1}{2}^h$. No A.B. at $9\frac{1}{2}^h$, or to 10^h .
 26 Clear. Moon. No A.B. seen to 10^h . [after.
 27 Cl'r to ab't 9^h ; aft. growing cl'y to 10^h : moon: no A.B. seen to 9^h or
 28 Ov't and raining. Obs. impos. to $9\frac{1}{2}^h$.
 29 Clear. Moon. No A.B. seen to $9\frac{1}{2}^h$. Obs. imperfect.
 30 Mostly ov't. Moon. About $9\frac{1}{2}^h$ clear spaces. No A.B. seen to $9\frac{1}{2}^h$.
 May 1 Partly clear. No A.B. to $9\frac{1}{2}^h$. Did not observe personally.
 2 Clear. Moon. No A.B. seen to 10^h .
 3 N. obsc. at $8\frac{3}{4}^h$: moon. [F. B.] E. C. H. in N. Y. City: ov't at 9^h .
 4 Ov't to 9^h , and d's later. [F. B.] In N.Y.: obs. n'y impos. at $9\frac{1}{4}^h$.
 5 Ov't. Obs. impos. to 9^h , and doubtless all night.
 6 Ov't and rainy. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 7 Ov't. Obs. impos. to $9\frac{1}{4}^h$, and doubtless all night.
 8 Ov't and rainy. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 9 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 10 Chiefly clear, but hazy. No A.B. to $9\frac{3}{4}^h$.
 11 Much clouded. No A.B. to 10^h .
 12 Partly clear, but very hazy. No A.B. seen to 9^h .
 13 Ov't and rainy. Obs. impos. to midnight.
 14 Mostly cl'y; later in evening clouds broken. No A.B. seen to $9\frac{1}{2}^h$.
 15 Cloudy, and then clear. No A.B. to $9\frac{1}{2}^h$.
 16 Mostly cloudy. No A.B. seen to $9\frac{1}{2}^h$, but obs. uncertain.
 17 Much clouded. Obs. nearly impos. No A.B. seen to 10^h .
 18 Clear. No A.B. to 10^h . Within from $9\frac{1}{2}^h$ to 10^h .
 19 Clear. No A.B. to 10^h .
 20 Mostly clear, but hazy. No A.B. to $9\frac{1}{4}^h$.
 21 Ov't. Obs. impos. to $9\frac{1}{4}^h$, and doubtless all night.

April 8th.—From this to $9^h 15^m$, sky much clouded. Moon. Observation very much embarrassed. Some suspicions of A.B., but hard to determine, to $9^h 15^m$.

April 14th.—No A.B. certainly seen, but somewhat suspected about $9^h 45^m$; clouds in N. make it uncertain.

April 16th.—Some suspicions of unusual light, but probably due to contrast of sky and cloud; this about 9^h .

April 20th.—Some suspicions of A.B. between 9^h and 10^h , but no certainty to 10^h .

1849.

- May 22 Mostly ov't. Obs. impos. to $9\frac{1}{4}^h$, and doubtless much later.
 23 Mostly clear. No A.B. to $9\frac{1}{2}^h$.
 24 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 25 Ov't. Obs. impos. to $9\frac{1}{4}^h$, and probably all night.
 26 Clear. No A.B. seen to $9\frac{1}{2}^h$. Moon begins to interfere.
 27 Ov't. Obs. impos. to 9^h , and probably all night.
 28 Ov't. Obs. impos. to 10^h , and doubtless all night. Rain in night.
 29 Ov't and rainy. Obs. impos. to $10\frac{1}{4}^h$, and doubtless all night.
 30 Ov't and rainy. Obs. impos. to 9^h , and doubtless all night.
 31 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
- June 1 Mostly ov't. Moon. Obs. impos. to $9\frac{1}{2}^h$, and prob. all night.
 2 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 3 Mostly clear to about $9\frac{1}{2}^h$. Moon.* [fore too cl'y for obs.
 4 M'y ov't to 10^h : moon: ab't 10^h N. tolerably cl'r: no A.B. seen: be-
 5 Clear. Moon. No A.B. seen to 10^h . [play c'd not have been seen.
 6 Sky embarrassed by cirri: moon: no A.B. seen to 10^h ; a mod. dis-
 7 Cirrous cl'ds: moon: obs. n'y impos. to 10^h , p. all n't: no A.B. seen.
 8 Clear. No A.B. to $9\frac{3}{4}^h$.
 9 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 10 Clear. No A.B. to 10^h .
 11 Cl'r, but som't hazy. No A.B. 10^h to $10\frac{1}{4}^h$. Within previously.
 12 Clear.* (365)
 13 Ov't. Obs. impos. to $10\frac{1}{4}^h$, and probably all night.
 14 Ov't. Obs. impos. to $10\frac{1}{4}^h$, and doubtless all night.
 15 Clear to 10^h , but somewhat hazy: no A.B. to 10^h : at $10\frac{1}{2}^h$ N. ov't.
 16 Clear. No A.B. to 10^h .
 17 Clear. No A.B. certainly seen to $9^h 50^m$.
 18 Clear. No A.B. to 10^h .
 19 Clear, though somewhat hazy about horizon. No A.B. to 10^h .
 20 Clear. No A.B. to $10\frac{1}{4}^h$.
 21 Clear, but hazy about horizon. No A.B. to 10^h .
 22 Clear but hazy and dusty. No A.B. to 10^h .
 23 Clear. No A.B. to $9^h 50^m$.
 24 Ov't. Obs. impos. to $9\frac{3}{4}^h$.
 25 Clear. Moon. No A.B. at $11\frac{1}{2}^h$.
 26 Clear. Moon. No A.B. to 10^h .
 27 Mostly clear. Moon. No A.B. seen to 10^h .
 28 Ov't and rainy. Obs. impos. to $11\frac{1}{2}^h$, and doubtless all night.
 29 Clear. Moon. No A.B. seen to 10^h .
 30 Clear. Moon. No A.B. seen to 10^h .
- July 1 Mostly clear. Moon. No A.B. seen to 10^h .
 2 Clear. Moon. No A.B. seen to 10^h .
 3 Clear between 9^h and 10^h . Moon. No A.B. seen to 10^h .
 4 Mostly ov't. Moon. Obs. impos. to $9\frac{1}{2}^h$.
 5 Ov't. Obs. impos. to $9\frac{1}{2}^h$.
 6 Many cirrous clouds: moon: obs. n'y impos. to $9\frac{1}{2}^h$: no A.B. seen.
 7 Ov't. Obs. impos. to $9\frac{1}{2}^h$.
 8 Ov't. Obs. impos. to $9\frac{3}{4}^h$.
 9 Ov't. Obs. impos. to $9\frac{3}{4}^h$, and probably all night.
 10 Clear to $9\frac{1}{2}^h$, and no A.B. After $9\frac{1}{2}^h$ ov't to $9^h 50^m$, and p. all n't.

June 3d.—Then and after, thinly overcast. No A.B. certain; yet at $9^h 30^m$ the N. seemed unusually light, exciting some suspicions of A.B. Cloudy during the night probably.

June 12th.—Some suspicions of auroral light about 10^h , but not certain. [A.B., seen by Mr. Charles R. Goodrich (Senior Class) about 11^h . A few streamers were seen, but no great display.]

June 17th.—About $9^h 45^m$ suspected a very faint light in N.

1849.

- July 11 Very clear. No A.B. at 10^h.
 12 Clear. A.B. about 9³/₄^h to 10^h.* (366)
 13 Clear. No A.B. to 10^h.
 14 Cloudless, but very hazy. No A.B. seen to 10^h.
 15 Clear, except a little cloudiness about the N. No A.B. to 9¹/₂^h.
 16 Clear for the most part, but N. somewhat cloudy. No A.B. to 10^h.
 17 Cloudless, but hazy. No A.B. to 10^h. Did not observe personally.
 18 Clear, except a few clouds in N. No A.B. to 10^h 10^m.
 19 Mostly clear to about 9¹/₂^h, after which ov't. No A.B. to 9¹/₂^h.
 20 Ov't. Obs. impos. to 9¹/₂^h, and d's all night. Showers in the night.
 21 Much cl'ded, after 9¹/₂^h wh'y so: no A.B. seen to 9¹/₂^h; obs. n'y impos.
 22 Clear. No A.B. to 9¹/₂^h.
 23 Mostly clear. Slight A.B. between 9^h and 10^h.* (367)
 24 M'y cl'r to 9¹/₂^h, aft. cl'y to 10^h, and obs. impos.: no A.B. seen to 9¹/₂^h.
 25 Ov't and drizzling. Obs. impos. to 9¹/₂^h, and probably all night.
 26 Ov't and showery. Obs. impos. to 9¹/₂^h, and probably later.
 27 M'y cl'r, but many long cirrous cl'ds: moon: no A.B. seen to 10^h.
 28 Clear. Moon. No A.B. to 10¹/₂^h.
 29 Clear. Moon. No A.B. to 9¹/₂^h.
 30 Clear in part. Moon. No A.B. to 10^h.
 31 Ov't. Obs. impos. to 9¹/₂^h, and doubtless all night.
 Aug. 1 Cl'r early: moon: no A.B. seen to 9¹/₂^h: bet'n 11^h and 12^h N. ov't.
 2 Mostly clear. Some cirri. Moon. No A.B. seen to 10^h.
 3 Clear. Moon. No A.B. seen to 10^h. No good obs.
 4 Ov't. Obs. impos. to 9¹/₂^h, and doubtless later.
 5 Mostly ov't. Obs. impos. to 9^h, and probably all night.
 6 Ov't and rainy. Obs. impos. to 10^h, and probably all night.
 7 Clear. No A.B. at 9¹/₂^h.
 8 Clear. No A.B. to 10^h.
 9 Ov't. Obs. impos. to 10^h, and all night. Rain in the night.
 10 Ov't and rainy. Obs. impos. to 10^h, and probably all night.
 11 Mostly ov't. Obs. n'y impos. to 9¹/₂^h at least: no A.B. seen to 9¹/₂^h.
 12 Mostly ov't early part of evening.*
 13 Ov't; copious showers in night: obs. impos. to 10^h, and d's all n't.*
 14 Mostly ov't. Obs. impos. to 9¹/₂^h.
 15 Clear. No A.B. to 10^h. Some clouds about 9³/₄^h.
 16 Mostly clear, but N. somewhat obscured. No A.B. to 10¹/₂^h.
 17 Clear. No A.B. to 10^h.
 18 Clear. No A.B. to 10^h.
 19 Clear. No A.B. to 9^h.
 20 Clear. No A.B. to 10^h.
 21 Clear. No A.B. to 10¹/₂^h.
 22 Partly clouded. No A.B. seen to 9^h.
 23 M'y cl'ded, and after 9^h obs. impos. to 10^h: moon: no A.B. seen.
 24 Clear. Moon. No A.B. to 10^h.
 25 Clear. Moon. No A.B. to 10^h.
 26 Clear. Moon. No A.B. to 9^h.
 27 E. C. H. at Northampton, Mass. Clear. Moon. No A.B. to 10^h.
 28 M'y cl'r to ab't 10^h, no A.B. seen: soon after 10^h ov't: so at 11¹/₂^h, and
 29 Nearly clear. Moon. No A.B. seen to 9³/₄^h. [p. all night.]

July 12th.—Not much display, light along N. horizon, and about 9^h 50^m a streamer 15° high. Streamers seen by Mr. Francis Bradley about 9^h 30^m.

July 23d.—Faint light low on N. horizon. I saw no streamers.

Aug. 12th.—About 9^h 40^m, sky about half clear, but a low cloud in N. No A.B. seen to 9^h 45^m, yet slightly suspected.

Aug. 13th.—At Middlebury, Vt., A.B. seen by Professor A. C. Twining.

1849.

- Aug. 30 M'y ov't: moon: obs. n'y impos. to $9\frac{1}{8}^h$, p. all night: no A.B. seen.
 31 Ov't and raining. Obs. impos. to 9^h , and doubtless all night.
- Sept. 1 Clear. Moon. No A.B. seen to 10^h .
 2 Clear. Moon. No A.B. seen to $9\frac{1}{4}^h$.
 3 Clear. Moon. No A.B. seen to 10^h .
 4 Ov't. Obs. impos. to 9^h , and doubtless all night.
 5 Clear. Moon. No A.B. seen to 10^h .
 6 Ov't and raining. Obs. impos. to 9^h , and doubtless all night.
 7 Clear. At 9^h to $9\frac{1}{2}^h$ suspected a slight A.B.* (368)
 8 M'y ov't: showers ab't $8\frac{1}{2}^h$ and $9\frac{1}{2}^h$, intervals p'y cl'r: no A.B. seen.
 9 Clear.* (369)
 10 Clear. No A.B. to $9\frac{1}{2}^h$.
 11 Clear. No A.B. to 9^h .
 12 Clear. No A.B. to $9\frac{1}{4}^h$.*
 13 Clear. No A.B. to 9^h .
 14 Clear. No A.B. to 9^h .
 15 Mostly ov't. Obs. impos. or nearly so, to $9\frac{1}{2}^h$.
 16 Nearly clear. Probably a slight A.B.* (370)
 17 P'y cl'r to 8^h , after which m'y ov't: no A.B. seen: at $9\frac{1}{2}^h$ still ov't.
 18 Mostly clear to $8\frac{1}{4}^h$ at least. A.B. from dark onward.* (371)
 19 Nearly clear. No A.B. to $9\frac{1}{2}^h$.
 20 Nearly clear. No A.B. to 10^h .
 21 Nearly clear. Moon begins to interfere. No A.B. to $9\frac{1}{2}^h$.
 22 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 23 Mostly clouded, but clear low in the N. Moon.*
 24 Mostly ov't. Moon. Obs. nearly or quite impos. to $9\frac{1}{2}^h$.
 25 Mostly clear. Moon. No A.B. seen to $9\frac{1}{4}^h$.
 26 Ov't up to 9^h , and rainy. Obs. impos. [F. B.]
 27 Clear. Moon. No A.B. to 10^h .
 28 Clear. Moon. No A.B. to 10^h .
 29 Ov't. Obs. impos. to 9^h , and probably all night.
 30 Ov't and rainy. Obs. impos. to 9^h , and doubtless all night.
- Oct. 1 Ov't. Obs. impos. to $9\frac{1}{2}^h$. Cleared up in part after 10^h .
 2 Ov't. Obs. impos. to 10^h .
 3 Ov't. Obs. impos. to 9^h , and probably all night.
 4 Clear. Moon rose about 8^h . No A.B. to $9\frac{1}{2}^h$.
 5 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 6 Ov't and stormy. Obs. impos. to 10^h , and doubtless all night.
 7 Ov't and rainy. Obs. impos. to 9^h at least.
 8 Ov't. Obs. impos. to $10\frac{1}{2}^h$, and probably all night.
 9 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 10 Ov't. Obs. impos. to $10\frac{1}{2}^h$, and doubtless all night.

Sept. 7th.—At times I was nearly sure of one. A faint light of 10° amplitude, about north point nearly. I saw no streamers.

Sept. 9th.—A faint A.B., as I think, with a shade of doubt. About 9^h to $9^h 15^m$ a very faint light, like a just perceptible aurora.

Sept. 12th.—A.B. seen by Mr. John Rockwell, near Portland, Me., $9^h 30^m$; two arches, highest at vertex 15° ; some streamers. At Pittsfield, Mass., Mr. S. C. Brace saw an auroral belt, spanning sky from E. to W. horizon, and passing overhead, about 11^h .

Sept. 16th.—I was within doors from 7^h to $8^h 45^m$. About 9^h , I saw what I took to be a segment of an auroral arch low in the N., and only W. of N., but ten minutes after, on reaching an open place, I could see nothing of it, and I waited ten minutes without seeing any more of it. The N. in general seemed a very little lighter than common, but was slightly hazy. [A.B. seen by Mr. Francis Bradley at $10^h 15^m$; no streamers.]

Sept. 18th.—At $7^h 58^m$ a few streamers W. of N. and moving W., altitude at top 20° . At $8^h 15^m$ all faded, and I retired. [At $10^h 30^m$ faint light, but no streamers. (F. B.)]

Sept. 23d.—About 9^h , had some suspicions of a little unusual light, probably due to moonlight. Same to 10^h .

1849.

- Oct. 11 Ov't to $9\frac{1}{2}^h$, and obs. impos. At 10^h clearing up, but no obs. after.
 12 Ov't to 10^h at least, and obs. impos.
 13 Clear. No A.B. seen certainly, but somewhat suspected.* (372)
 14 Clear. A.B. seen about 10^h . [Streamers seen by F. B.] (373)
 15 Nearly clear. N. horizon a little obscured. No A.B. to 11^h .
 16 P'y cl'r to 7^h , and no A.B. seen; after 7^h ov't to $10\frac{1}{2}^h$, and obs. impos.
 17 Ov't. Obs. impos. to 11^h , and doubtless all night.
 18 Mostly ov't. Obs. impos. to 10^h , and doubtless all night.
 19 Much clouded. No A.B. certainly seen, but occasionally susp.
 20 Clear. Moon. No A.B. seen to 9^h .
 21 Ov't and raining. Obs. impos. to 10^h , and doubtless all night.
 22 Mostly clear. Moon. No A.B. seen to 10^h .
 23 Mostly clear to about 8^h ; after 8^h no obs. possible to 10^h at least.
 24 Clear. Moon. No A.B. seen to 10^h .
 25 Cloudless, but hazy and smoky. Moon. No A.B. seen to $9\frac{1}{2}^h$.
 26 Mostly ov't, especially after 9^h . Moon. No A.B. seen to 8^h .
 27 Clear. Moon. No A.B. seen to 9^h . (?)
 28 Much clouded. Moon. Obs. nearly or quite impos. to 9^h at least.
 29 Ov't and raining. Obs. impos. to 10^h , and probably all night.
 30 Mostly ov't. Moon. Obs. nearly impos. to 10^h .
 31 Clear. Moon. No A.B. seen to 10^h .
 Nov. 1 N. mostly ov't, and obs. impos. to 9^h . Moon.
 2 Clear. Moon. No A.B. seen to $9\frac{1}{2}^h$. Within from $7\frac{1}{2}^h$ to $9\frac{1}{4}^h$.
 3 Very smoky and hazy: moon: obs. n'y impos. to 10^h : no A.B. seen.
 4 M'y ov't: obs. impos. to 9^h , and p. all night: m'y ov't 5^h to 6^h A.M.
 5 Ov't. Obs. impos. to 11^h , and doubtless all night.
 6 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 7 Ov't and misty. Obs. impos. to 10^h , and doubtless all night.
 8 Ov't and rainy: obs. impos. to 10^h , d's all n't: thunder and lightning
 9 Ov't and rainy. Obs. impos. to 10^h , and doubtless later. [ab't 9^h .
 10 Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 11 Cl'r: no A.B. to 8^h , when much obsc. by cl'ds: at 5^h A.M. cl'r, no A.B.
 12 Clear. No A.B. to 10^h . Within doors from $7\frac{1}{2}^h$ to 9^h .* (374)
 13 Clear. No A.B. to 10^h . Did not watch personally.
 14 Cl'r, but rather smoky ab't hor.: no A.B. to $9\frac{1}{2}^h$: within from 7^h to 9^h .
 15 Clear. No A.B. to 10^h .
 16 Very much cl'ded, and obs. n'y impos. to 10^h at least: no A.B. seen.
 17 Mostly ov't. No A.B. seen to 10^h , and obs. nearly impos.
 18 M'y ov't to 7^h ; after 8^h wh'y so: obs. impos. to 10^h , and d's all n't.
 19 Ov't and raining. Obs. impos. to 10^h , and doubtless all night.
 20 Ov't. Obs. impos. to 10^h , and doubtless later. Cleared off in night.
 21 Clear. Moon. No A.B. seen to 10^h . Within most of evening.
 22 Clear early: moon: after 8^h ov't, and obs. impos. to 10^h at least: no
 23 Mostly ov't. Moon. Obs. impos. to 10^h . [A.B. seen.
 24 Ov't. Obs. impos. to 10^h , and doubtless all night.
 25 Ov't. Obs. impos. to 10^h . At $5\frac{1}{2}^h$ A.M. of 26th very cl'r: no A.B.
 26 M'y ov't to ab't 8^h ; after that m'y cl'r: moon: no A.B. seen to $9\frac{1}{2}^h$.
 27 Clear. Moon. No A.B. seen to 9^h .
 28 Much clouded. Moon. Obs. nearly impos. to $9\frac{1}{2}^h$. No A.B. seen.
 29 Mostly clear. Moon. No A.B. seen to 10^h . Within most of ev'g.

Oct. 13th.—At 10^h an A.B., low down but plain; no streamers. [F. B.]

Oct. 15th.—A.B. seen at Cambridge, Eng. *Lond. Phil. Mag.*, Feb., 1850, p. 116.

Oct. 22d.—A.B. seen at Greenwich, Eng. *Lond. Phil. Mag.*, Feb., 1850, p. 116.

Nov. 12th.—[A.B. from 11^h 15m to 11^h 45m, streamers. (F. B.)] At 5^h A.M. of 13th very clear, and no A.B.

1849.

- Nov. 30 Mostly clear. Moon. No A.B. seen to 9 $\frac{1}{2}$ ^h.
- Dec. 1 Cloudy in part. Moon. No A.B. seen to 9^h, but obs. very unc.
- 2 Ov't. Obs. impos. to 9 $\frac{1}{2}$ ^h, and doubtless all night.
- 3 Ov't. Obs. impos. to 10^h, and probably all night.
- 4 Ov't. Obs. impos. to 9 $\frac{1}{2}$ ^h, and probably all night.
- 5 Mostly clear to about 8^h, after cloudy to 9^h at least. No A.B. seen.
- 6 Clear to about 7^h, and no A.B.: after too cl'y for obs. to 9 $\frac{1}{2}$ ^h at least.
- 7 Very clear. No A.B. certain to 9^h.* (375)
- 8 Mostly ov't. No A.B. seen to 9^h.
- 9 Ov't. Obs. impos. to 9^h, and doubtless all night.
- 10 Ov't and snowing. Obs. impos. to 10^h, and doubtless all night.
- 11 Very clear. No A.B. to 10^h.
- 12 Clear. No A.B. to 9 $\frac{1}{2}$ ^h. Within doors from 6 $\frac{1}{2}$ ^h to 9 $\frac{1}{4}$ ^h.
- 13 Ov't. Obs. impos. to 9^h; about 9^h clearing, but not about N. hor.
- 14 Mostly clear after 8^h. No A.B. to 9 $\frac{1}{2}$ ^h.
- 15 Mostly ov't to 9^h.
- 16 Ov't. Obs. impos. to 9^h, and probably most of the night.
- 17 Clear. No A.B. to 8^h. Did not observe personally.*
- 18 Clear. No A.B. to 10^h, but at times susp. a very faint light on hor.
- 19 Ov't. Obs. impos. to 9 $\frac{1}{2}$ ^h, and doubtless all night.
- 20 Ov't. Obs. impos. to 10^h, and doubtless later. [personally.]
- 21 M'y ov't: moon: no A.B. seen to 9^h; obs. n'y impos.: c'd not obs.
- 22 Ov't. Obs. impos. to 9^h, and probably most of the night.
- 23 Mostly ov't. Moon. Obs. impos. to 9^h, and probably all night.
- 24 Ov't. Obs. impos. to 9 $\frac{1}{2}$ ^h, and doubtless all night.
- 25 Clear. Moon. No A.B. seen to 9^h.
- 26 Mostly clear. Moon. No A.B. seen to 10^h. Within most of ev'g.
- 27 Clear. Moon. No A.B. seen to 9 $\frac{1}{2}$ ^h.
- 28 Ov't. Obs. impos. to 10^h, and doubtless all night.
- 29 Ov't. Obs. impos. to 10 $\frac{1}{2}$ ^h, and probably later.
- 30 Ov't. Obs. impos. to 9^h, and doubtless all night.
- 31 Mostly clear. Moon after 7 $\frac{1}{2}$ ^h. No A.B. seen to 9^h.

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- Jan. 1 Clear: moon late in ev'g: no A.B. to 10^h. Within most of ev'g.
- 2 Ov't. Obs. impos. to 10^h, and probably most of the night.
- 3 Ov't. Obs. impos. to 9^h, and probably much later.
- 4 Ov't. Obs. impos. to 10^h. Clearing off soon after 10^h.
- 5 Very clear. No A.B. to 10^h.
- 6 Clear to 7^h at least, and no A.B.: at 8 $\frac{1}{2}$ ^h mostly ov't, and p. all night.
- 7 Ov't: some sleet and much rain in ev'g: obs. impos. to 9^h, p. all n't.
- 8 Ov't. Obs. impos. to 10^h, and doubtless all night.
- 9 Ov't: obs. impos. to 9^h: cl'ring soon after: [no A.B. at 9 $\frac{1}{2}$ ^h. (F. B.)]
- 10 Clear. No A.B. to 9^h.
- 11 Ov't. Obs. impos. to 9^h, and probably all night.
- 12 Clear. No A.B. to 10^h.*
- 13 Ov't. Obs. impos. to 9^h, and doubtless all night.*
- 14 Clear. No A.B. to 10^h.
- 15 Ov't. Did not observe personally.
- 16 Clear, for the most part. No A.B. to 10^h.
- 17 Ov't. Obs. impos. to 10^h, and doubtless all night.

Dec. 7th.—About 9^h suspected some faint light on the horizon. [At 12^h A.B., no streamers. (F. B.)]

Dec. 17th.—A.B. suspected by Mr. Francis Bradley at 11^h.

Jan. 12th.—About 10^h the N. seemed to be a very little lighter than the rest of the heavens.

Jan. 13th.—At 6^h A.M. of 14th still wholly overcast, and N. appeared much lighter than the rest of the sky. Perhaps due to A.B., or to thinness of cloud there.

1850.

- Jan. 18 Ov't to about 9^h. Between 9^h and 10^h clearing up.* (376)
 19 Clear: no A.B., or perhaps about 10^h ground for slight suspicion.
 20 Thinly ov't. Moon. No A.B. seen to 9^h, and obs. nearly impos.
 21 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 22 Ov't early in ev'g, clear later. Moon. No A.B. seen to 10¹/₂^h.
 23 Clear. Moon. No A.B. seen to 10^h.
 24 Mostly ov't. Obs. impos. to 10^h, and probably all night.
 25 Mostly ov't. Moon. No A.B. seen to 10^h, but obs. nearly impos.
 26 Ov't. Obs. impos. to 10^h.
 27 Clear and mild. Moon. No A.B. seen to 9¹/₂^h.
 28 Ov't. Obs. impos. to 9^h, and probably all night.
 29 Clear. Moon after about 7¹/₂^h. No A.B. seen to 10^h.
 30 Clear. Moon after 8¹/₂^h. No A.B. to 10¹/₂^h.
 31 Much clouded. No A.B. seen to 10^h, but obs. necessarily unc.
- Feb. 1 Cl'r first part of ev'g, becoming cl'y bet'n 9^h and 10^h: no A.B. to 9^h.*
 2 Ov't; rain. Obs. impos. to 10^h, and doubtless all night.
 3 Clear: a very faint aur. light in N. ab't 9^h: I saw no streamers. (377)
 4 Ov't early. After 8^h clear, and no A.B. to 9^h.
 5 Very clear. No A.B. to 10¹/₄^h, yet faintly suspected about 10^h.
 6 Clear early part of evening. A.B. about 7^h.* (378)
 7 P'y cl'r: no A.B. to 7^h or at 10^h: cl'ds impair obs.: within, 7^h to 10^h.
 8 Ov't. Obs. impos. to 10^h, and doubtless all night.
 9 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 10 Very clear. No A.B. to 9^h. At 5^h A.M. clear, and no A.B.
 11 Mostly cloudy to 10^h.* (379)
 12 Much cl'ded; obs. impaired: ab't 10^h cl'r; no A.B., yet som't obsc.
 13 M'y cl'r, yet hazy: ab't 10^h m'y cl'r, except cl'd low in N.: no A.B.
 14 Ov't and rainy before 7^h; at 8^h and after clear, and no A.B. to 10^h.
 15 Clear. No A.B. to 8^h. [Or to 11^h. (F. B.)]
 16 Clear. No A.B. to 8¹/₂^h.
 17 Clear. Moon begins to interfere. No A.B. to 9^h.
 18 Mostly clear. Moon. No A.B. seen to 9³/₄^h.
 19 Clear. Moon. No A.B. seen to 9^h.
 20 Ov't. Obs. impos. to 10^h.
 21 Mostly clear. Moon. No A.B. seen to 10^h.
 22 Clear. Moon. No A.B. seen to 10¹/₄^h.* (380)
 23 Clear. Moon. No A.B. seen to 9^h. Did not observe personally.
 24 Ov't. Obs. impos. to 9^h, and probably all night.
 25 Mostly clear. Moon. No A.B. seen to 10^h. Within from 8^h to 9¹/₂^h.
 26 Mostly clear. Moon. No A.B. seen to 10¹/₂^h. Within most of ev'g.
 27 Clear. Moon. No A.B. seen to 10^h.
 28 Ov't. Obs. impos. to 10^h, and doubtless all night.
- Mar. 1 Ov't. Obs. impos. to 10^h.
 2 Chiefly clear early in ev'g: about 10^h and after ov't: no A.B. to 9^h.
 3 Clear. No A.B. to 9^h, and none at 5^h A.M. of 4th.*
 4 Clear. A.B. most of evening to 10^h at least.* (381)

Jan. 18th.—About 10^h A.B. bright. I saw no streamers, looking a few minutes, but only a strong light about 5° high, amplitude 60° to 70°.

Feb. 1st.—About 10^h strongly suspected some auroral light low in the N.

Feb. 6th.—A mere general light low on N. horizon. I saw no streamers, watching five or ten minutes. Within doors from 7^h 30^m to 10^h. At 10^h wholly overcast.

Feb. 11th.—At 10^h nearly clear, except low cloud in N. and N.W. No A.B. then. [At 11^h, A.B., low general light, no streamers. (F. B.)] Possibly this refers to the 12th.

Feb. 22d.—At 11^h an A.B., imperfect arch 4° to 5° high, 50° to 60° amplitude. No streamers. [F. B.]

March 3d.—A.B. most probably, at 11^h. [F. B.]

March 4th.—Little general light; groups of streamers now and then, 20° to 30° high at top, and chiefly E. of N.

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- Mar. 5 Clear. No A.B. to 10^h.
 6 Ov't; copious rain. Obs. impos. to 10^h, and doubtless all night.
 7 Ov't. Obs. impos. to 10^h, and probably all night.
 8 Clear. No A.B. to 10^h.
 9 Ov't. Obs. impos. to 9½^h.
 10 Clear. A.B., slight.* (382)
 11 Mostly clear to about 10^h.* [A.B. seen to 10^h.
 12 M'y ov't: obs. n'y impos. below alt. of 40° to 9½^h; clearer after: no
 13 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 14 Clear. No A.B. to 10^h. Within doors from 7^h to 9^h.
 15 Clear. No A.B. to 9^h.
 16 Ov't. Obs. impos. to 9^h, and doubtless all night.
 17 Ov't. Obs. impos. to 8^h, and doubtless all night.
 18 Ov't. Obs. impos. to 10^h, and doubtless all night.
 19 Very clear. Moon. No A.B. seen to 10^h.
 20 Clear. Moon. No A.B. seen to 10^h.
 21 At 9^h N. ov't, and obs. impos. Within doors from 7^h to 9^h.
 22 Ov't. Obs. impos. to 9^h, and doubtless all night.
 23 Ov't. Obs. impos. to 9^h, and doubtless all night.
 24 Clear. Moon. No A.B. seen to 9½^h.
 25 Clear. Moon. No A.B. seen to 9¼^h.*
 26 Clear. Moon. No A.B. seen to 10^h.
 27 Ov't: obs. impos. to 10^h, and d's all night. Did not myself observe.
 28 Clear. Moon. No A.B. seen to 9^h.
 29 Clear. Moon. No A.B. seen to 9½^h. [imperfect.
 30 Som't hazy and cl'y. Moon. No A.B. seen to 9½^h, but obs. nec'y
 31 Clear. Moon after 9^h 25^m.* (383)
- April 1 Mostly clear, though hazy about horizon. No A.B. to 10^h.
 2 Cloudless, but hazy towards horizon. No A.B. to 10^h.
 3 Ov't and rainy. Obs. impos. to 10½^h, and doubtless all night.
 4 Ov't. Obs. impos. to 10½^h, and probably all night.
 5 Ov't and snowing. Obs. impos. to 10^h, and doubtless all night.
 6 Partly clouded to about 9^h; after that clear.* (384)
 7 Clear. A.B., slight to 9^h.* (385)
 8 Clear after 8^h; previously more or less cloudy.*
 9 Clear. No A.B. to 9½^h.
 10 Clear. No A.B. to 9½^h.
 11 Hazy, and after 9^h nearly ov't. No A.B. to 9½^h.
 12 Clear, chiefly. No A.B. to 10^h. Within doors most of evening.
 13 Ov't. Snow squalls. Obs. impos. to 9½^h, and d's much later.
 14 Clear. No A.B. to 9^h.
 15 Clear. No A.B. to 10^h.
 16 Clear. Moon. No A.B. seen to 9½^h.
 17 Clear. Moon. No A.B. seen to 10^h.

March 10th.—Not seen to about 10h, when there was a general light along the N., about 40° amplitude, and 5° altitude. I saw no streamers, but did not watch many minutes.

March 11th.—No A.B. to 10h, yet about 10h somewhat suspected.

March 25th.—Brilliant display of A.B. at New York at 4h A.M. of 25th, according to *N. Y. Spectator* of 28th inst.

March 31st.—A.B. not very conspicuous. Amplitude 40° or 50°, altitude 5° to 8°. I saw no streamers, while looking ten minutes about 9h.

April 6th.—A.B. beginning at dusk. Amplitude of light 100° to 110°, altitude 20° to 30°, much diffuse light, somewhat reddened. I saw not many streamers. The display was however considerable.

April 7th.—A general light 30° amplitude, more or less. I saw no streamers. Altitude 5° or 7°.

April 8th.—No A.B. to 10h, or possibly a very faint light about 10h.

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- Apr. 18 M'y cl'r. Moon. No A.B. seen to 10^h. Did not myself observe.
 19 Clear. Moon. No A.B. seen to 10^h.
 20 Mostly ov't. Obs. impos. to 9^h.
 21 Clear. Moon. No A.B. seen to 9^h. A cloud on N. hor., 5° high.
 22 Ov't and misty. Obs. impos. to 11^h, and doubtless all night.
 23 Clear. Moon. No A.B. seen to 10¹/₂^h.
 24 Clear. Moon. No A.B. seen to 9^h.
 25 Ov't. Moon. Obs. impos. to 10^h, and doubtless all night.
 26 Ov't. Obs. impos. to 9^h, and doubtless all night.
 27 Ov't. Obs. impos. to 9¹/₂^h, and probably all night.
 28 Ov't; rain after 8^h. Obs. impos. to 10^h, and doubtless all night.
 29 Clear. No A.B. to 10¹/₂^h.
 30 Clear. No A.B. to 9¹/₂^h.
 May 1 Clear. No A.B. to 10^h.
 2 Clear. No A.B. to 10^h.
 3 Half clear. No A.B. to 9^h.
 4 Ov't. Obs. impos. to 10^h, and doubtless all night.
 5 Ov't. Obs. impos. to 9^h, and doubtless all night. Abundant rain.
 6 Half clear; many clouds about the N. No A.B. to 9¹/₂^h.
 7 Nearly clear.* (386)
 8 Ov't. Obs. impos. to 10^h, and doubtless all night.
 9 Clear. No A.B. to 10^h. [after 10^h: saw no A.B.]
 10 Cl'r to 8³/₄^h: no A.B. [F. B.] E.C.H. at N. York: cl'y early; m'y cl'r
 11 Clear. No A.B. seen to 9¹/₂^h. Did not personally observe.
 12 Clear. A.B. from dusk to 9¹/₂^h at least.* (387)
 13 Mostly ov't. Obs. nearly or quite impos. to 9¹/₂^h.
 14 Ov't. Obs. impos. to 9¹/₂^h at least.
 15 Ov't. Obs. impos. to 10^h, and doubtless all night.
 16 Ov't. Moon. Obs. impos. to 10¹/₂^h.
 17 No obs. here. [F. B.] E.C.H. at N. Y.: clear: no A.B. seen to 10^h.
 18 Clear. Moon. No A.B. seen to 10^h.
 19 Clear. Moon. No A.B. seen to 9³/₄^h.
 20 Clear. Moon. No A.B. seen at 9¹/₄^h.
 21 Clear. No A.B. to 9¹/₂^h. [sonally.
 22 Ov't and r'y: obs. impos. to 10^h, and d's all n't: did not observe per-
 23 Ov't; rainy. Obs. impos. to 11^h, and doubtless all night.
 24 Much clouded. Moon. Obs. nearly impos. to 10^h. No A.B. seen.
 25 Ov't. Obs. impos. to 10^h, and doubtless all night.
 26 Ov't. Obs. impos. to 10^h, and probably all night.
 27 Partly clear to 9¹/₂^h, after that nearly clear. Moon.*
 28 Ov't; thunder shower bet'n 8^h and 9^h: obs. impos. to 9¹/₂^h, p. all n't.
 29 Ov't. Obs. impos. to 10^h, and doubtless all night.
 30 Ov't. Obs. impos. to 10^h, and doubtless all night.
 31 Ov't. Obs. impos. to 10^h, and probably all night.
 June 1 Clear. No A.B. to 10^h.
 2 Mostly clear. N. partly obscured by clouds.*
 3 Mostly ov't. Obs. nearly impos. to 10^h. No A.B. seen.
 4 Clear. No A.B. to 10^h.
 5 Clear. No A.B. to 10¹/₄^h.

May 7th.—A.B. from dusk onward. Amplitude 80°, more or less, altitude of arch 6° to 10°; occasional faint streamers 10° to 12° high; arch not distinct, but rather bright. Watched to 9h 50m only.

May 12th.—An imperfect arch of light just above the N. horizon, 3° or 4° elevated at center; amplitude 60°, more or less. I saw no streamers.

May 27th.—No A.B. seen to 10h, yet somewhat suspected.

June 2d.—No A.B. to 9h 50m, but slightly suspected about that time.

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- June 6 Clear in general, but hazy around horizon. No A.B. to 10^h.
 7 Clear in general, but very hazy around horizon. No A.B. to 10^h.
 8 Ov't. Obs. impos. to 10^h, and probably all night.
 9 Ov't. Obs. impos. to 10^h, and doubtless all night.
 10 M'y ov't: obs. n'y impos. to 10¹/₄^h: no A.B. cert. seen; some slight
 11 Clear. No A.B. to 10^h. [suspicious.
 12 Clear. No A.B. to 10^h.
 13 Clear. No A.B. to 10^h.
 14 Mostly clouded. Moon. No A.B. seen to 10^h, but obs. n'y impos.
 15 Partly cloudy. Moon. At 11^h no A.B. seen.
 16 Clear. Moon. No A.B. seen to 10^h.
 17 Clear. Moon. No A.B. seen to 10^h.
 18 Ov't. Obs. impos. to 10^h, and probably all night.
 19 Clear. Moon. No A.B. seen to 10^h.
 20 Ov't; rain. Obs. impos.
 21 Clear. Moon. No A.B. seen to 10¹/₄^h.
 22 Ov't. Obs. impos. to 10^h, and doubtless all night.
 23 Ov't. Obs. impos. to 10^h, and probably all night.
 24 Ov't, thinly. Moon. Obs. impos. to 10^h, and probably all night.
 25 Clear, chiefly. Moon. No A.B. seen to 10^h.
 26 Clear. Moon. No A.B. seen to 10^h.
 27 Clear. Moon. No A.B. seen to 10^h.
 28 Ov't. Obs. impos. to 10^h, and doubtless all night.
 29 Nearly clear. N. somewhat clouded. No A.B. to 10^h.
 30 Cl'r, except that the N. is partly obsc. by cl'ds. No A.B. to 9^h 50^m.
 July 1 Clear. No A.B. to 10^h, but slightly suspected about 10^h.
 2 Ov't. Obs. impos. to 10^h, and doubtless all night.
 3 Ov't. Obs. impos. to 10^h, and doubtless all night.
 4 Ov't. Obs. impos. to 10^h, and probably all night.
 5 Ov't. Lightning d'g ev'g in N. Obs. impos. to 9³/₄^h, and d's later.
 6 Clear. No A.B. at 10¹/₂^h. Within doors from 9^h to 10¹/₂^h.
 7 Nearly clear to 10^h, but then clouding up, so as to prevent obs.
 8 Clear. No A.B. to 10^h.
 9 Clear. No A.B. to 10^h.
 10 Clear. No A.B. to 10¹/₄^h.
 11 Clear.* (388)
 12 Clear. No A.B. to 10^h.* (389)
 13 Ov't early; clearing towards 10^h: no A.B. to 10^h, but N. som't obsc.
 14 Ov't at 10^h. Scud from south. Obs. impos.
 15 Ov't; rainy. Obs. impos. to 10^h, and prob. all night. [impos.
 16 Mostly clouded with sea-scud: moon: no A.B. seen to 10^h: obs. n'y
 17 Ov't. Obs. impos. to 10^h, and probably all night.
 18 Ov't. Obs. impos. to 10^h, and doubtless all night.
 19 P'y ov't: obs. impos. to 10^h. [N'y cl'r, low cloud in N., no A.B. at
 20 Clear. Moon. No A.B. seen to 10^h. [10^h: moon. (F. B.)]
 21 Clear. Moon. No A.B. seen to 10^h.
 22 Nearly ov't; clouds broken. Moon. Obs. impos. to 10^h.
 23 Nearly clear. Moon. No A.B. seen to 10^h.
 24 Clear. Moon. No A.B. seen to 9^h 50^m. [Nor to 11^h. (F. B.)]
 25 Ov't. Obs. impos. to 9³/₄^h, and doubtless later.
 26 Mostly ov't. Obs. impos. to 10^h.

July 6th.—A.B. strongly suspected at 9h 45m. [F. B.]

July 11th.—Fine display of A.B., beginning as early at least as 8h 55m.

July 12th.—A.B. about 12h; faint, some streamers. [F. B.]

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- July 27 Ov't to $10\frac{1}{2}^h$, and probably all night. Obs. impos.
 28 Mostly ov't to 10^h . Unwell and did not observe personally.
 29 Mostly clear, but some clouds about the N. No A.B. to $10\frac{1}{4}^h$.
 30 Much cl'ded until about 10^h , when nearly cl'r. No A.B. seen to 10^h .
 31 Ov't in N.; obs. n'y impos. to 10^h ; cl'r in S.E. and zenith $9\frac{1}{2}^h$ to 10^h .
 Aug. 1 Cl'r to 10^h , when sky n'y filled with thin broken cl'ds: no A.B. to 10^h .
 2 Nearly clear. No A.B. to $10\frac{1}{2}^h$.
 3 Ov't. Obs. impos. to 10^h at least.
 4 Clouded below alt. of 30° . Clear above. No A.B. seen to $9\frac{1}{3}^h$.
 5 Clear for the most part, but some clouds in N. No A.B. to 10^h .
 6 Ov't. Thunder shower 8^h to $9\frac{1}{2}^h$. Obs. impos. to 10^h at least.
 7 Much clouded. About 10^h N. nearly clear. No A.B. then.
 8 Very hazy. Obs. nearly impos. to 10^h . Ov't at daylight of 9th.
 9 Mostly clear. A.B.* (390)
 10 Clear. Probably a faint A.B. about 9^h . Retired at $9\frac{1}{2}^h$.* (391)
 11 Clear. Moon. No A.B. to 9^h .
 12 Clear, but somewhat hazy about horizon. Moon.*
 13 Ov't. Obs. impos. to 10^h at least.
 14 Ov't; clouds broken. Moon. Obs. impos.
 15 Ov't until about 10^h , when N. p'y cl'r: moon: no A.B. seen to 10^h .
 16 Mostly ov't. Moon. No A.B. seen to 10^h , but obs. nec'y imperf.
 17 Clear. Moon.*
 18 Clear to $9\frac{1}{2}^h$, when the N. was ov't. Moon. No A.B. seen to $9\frac{1}{2}^h$.*
 19 M'y ov't. Moon. Obs. n'y or quite impos. to $9\frac{1}{2}^h$, and p. all night.
 20 Ov't and rainy. Obs. impos. to $10\frac{1}{2}^h$, and doubtless later.
 21 Clear. Moon. No A.B. seen to $9\frac{3}{4}^h$. [Nor to 11^h . (F. B.)]
 22 Mostly cl'r, but some cl'ds low in N.: moon: no A.B. seen to $10\frac{3}{4}^h$.
 23 N. mostly ov't. Moon. Obs. nearly or quite impos. to 11^h .
 24 N. ov't, and before 10^h the whole sky ov't: obs. impos. all night d's.
 25 Clear. No A.B. seen to 9^h .
 26 Clear. No A.B. seen to $10\frac{1}{4}^h$.
 27 Clear. No A.B. to 9^h .
 28 Clear. No A.B. to $9\frac{1}{2}^h$. [A.B. slightly suspected at $10\frac{1}{2}^h$. (F.B.)]
 29 Clear. No A.B. to $9\frac{1}{4}^h$.
 30 Mostly clear. No A.B. to 9^h .
 31 Clear. No A.B. to 10^h .
 Sept. 1 Ov't. Obs. impos. to 9^h , and probably all night.
 2 Ov't and rainy. Obs. impos. to 9^h , and doubtless all night.
 3 Clear. A.B., no streamers seen, low on hor., chiefly E. of N. (392)
 4 Clear. A.B., diffuse light, some streamers. (393)
 5 Ov't. Obs. impos. to 10^h , and prob. all night. [p. all night.
 6 M'y ov't after 8^h : no A.B. seen to 9^h , but obs. after 8^h n'y impos., and
 7 Ov't and rainy. Obs. impos. to 9^h , and doubtless all night.
 8 Clear. No A.B. to 8^h . [A.B. strongly suspected at $10\frac{1}{2}^h$. (F. B.)]
 9 Ov't. Obs. impos. to 10^h , and doubtless later.
 10 Mostly ov't to about 9^h , then partially clearing.* (394)

Aug. 9th.—First seen about $8^h 45^m$, then a faint light along N. horizon, visible most of the night. About 1^h A.M. of 10th, arch 2° or 3° high, amplitude 70° , more or less; many streamers 20° to 30° high; streamers again between 2^h and 3^h .

Aug. 10th.—Streamers. [Mr. Mason C. Weld.]

Aug. 12th.—No A.B. to 10^h , yet slightly suspected.

Aug. 17th.—No A.B. seen to 10^h , but I scarcely made any observation. [A.B. suspected. (F. B.)]

Aug. 18th.—A.B. suspected at $10^h 15^m$. [F. B.]

Sept. 10th.—An A.B. was seen at 9^h , many streamers, not very bright, through amplitude of 60° or more, chiefly W. of N., reaching up 10° or 15° , cloud on horizon concealing much. At $9^h 15^m$, more cloudy and little to be seen.

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- Sept. 11 Clear. Moon begins to interfere. No A.B. to $9\frac{1}{2}^h$.
 12 E. C. H. at Lyme. Clear. Moon. No A.B. to 9^h .
 13 Clear. Moon. No A.B. seen to 10^h .
 14 Clear. Moon. No A.B. to 10^h . [F.B.] Did not watch personally.
 15 Clear. Moon. No A.B. seen to 9^h .
 16 Clear. Moon. No A.B. seen to 10^h .
 17 Clear. Moon. No A.B. seen to $9\frac{1}{2}^h$.
 18 E. C. H. at New York City. Ov't. Obs. impos. to 10^h .
 19 E. C. H. at N. Y. City. At $10\frac{1}{3}^h$ clear: moon: no A.B. seen to $10\frac{1}{2}^h$.
 20 Clear. Moon. No A.B. seen to $9\frac{1}{2}^h$.
 21 Clear. Moon. No A.B. seen to 10^h .
 22 Clear. Moon. No A.B. seen to 9^h .
 23 Clear. Moon. No A.B. seen to $9\frac{1}{2}^h$. Slightly suspected about 8^h .
 24 Ov't. Obs. impos. to 10^h at least.
 25 Ov't. Obs. impos. to 10^h at least, and doubtless all night.
 26 Ov't. Obs. impos. to 9^h , and doubtless all night. [later.
 27 Ov't; thunder shower 8^h to 9^h , and later: obs. impos. to $9\frac{1}{2}^h$, and d's
 28 Ov't to $8\frac{1}{2}^h$: aft. cl'ds ab't N.: no A.B. seen to $9\frac{1}{2}^h$, but obs. imperf.
 29 Clear: no A.B. seen to 10^h : within most of ev'g: obs. not thorough.
 30 Clear, except N. partly clouded.* (395)
 Oct. 1 Very clear. A.B.* (396)
 2 Very cl'r. A.B., streamers 20° to 30° high, seen to ab't 10^h . (397)
 3 Clear. Slight suspicions of A.B. during the ev'g; unc. at $9\frac{1}{2}^h$.
 4 Clear. No A.B. Unwell, and did not watch personally.
 5 M'y ov't to about $9\frac{1}{2}^h$, and obs. impos. At $9\frac{3}{4}^h$ clear, and no A.B.
 6 Clear. No A.B. to $9\frac{1}{2}^h$.
 7 Clear. No A.B. to 10^h .
 8 Mostly ov't in N. No A.B. seen to 9^h , and obs. nearly impos.
 9 Cloudy and hazy, but N. clear in part. No A.B. to $10\frac{1}{2}^h$.
 10 Cl'ss but hazy. Moon begins to interfere. No A.B. seen to 10^h .
 11 Ov't. Obs. impos. to 9^h , and probably all night.
 12 Ov't. Obs. nearly or quite impos. to 9^h at least.
 13 Mostly ov't. Moon. Obs. nearly or quite impos. to 9^h .
 14 Mostly clear. Moon. No A.B. seen to 9^h .
 15 Clear. Moon. No A.B. seen to 10^h .
 16 Clear. Moon. No A.B. seen to 9^h .
 17 Ov't. Moon. Obs. impos. to 10^h , and doubtless all night.
 18 Ov't and rainy. Obs. impos. to $10\frac{1}{4}^h$, and doubtless all night.
 19 Cloudy early in ev'g. At 9^h (at least) clear: moon: no A.B. to $9\frac{1}{2}^h$.
 20 Ov't and rainy. Obs. impos. to 9^h , and probably all night.
 21 Clear. Moon. No A.B. to $10\frac{1}{2}^h$.
 22 Cloudless, but hazy. Moon. No A.B. seen to 10^h .
 23 Mostly ov't. Moon. Obs. impos. to 10^h .
 24 Ov't and rainy. Obs. impos. to 10^h , and doubtless all night.
 25 Ov't; some rain. Obs. impos. to 10^h , and probably all night.
 26 Ov't; rainy. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 27 Clear. No A.B. at 7^h . Within doors from 7^h to 9^h .* (398)
 28 Clear. No A.B. to $10\frac{1}{4}^h$.

Sept. 15th.—A.B. at Newport at midnight; red light. [Professor James Hadley.]

Sept. 30th.—A.B. slight, not suspected until about 9^h . A low diffuse light, amplitude 30° or more. At 10^h brighter, sky cloudier. I saw no streamers.

Oct. 1st.—First seen at 9^h , probably visible earlier; a general light. (Streamers between 7^h and 8^h .)

Oct. 27th.—About 9^h a slight A.B., merely a faint diffuse light extending 2° or 3° upward from horizon.

1850.

- Oct. 29 Clear. A very slight auroral illumination about 7^h.* (399)
 30 M'y cl'r to 7^h, no A.B.: within 7^h to 9³/₄^h; much cl'ded 9³/₄^h to 11^h; obs.
 31 Clear. No A.B. to 10^h. [n'y impos.: no A.B. seen.]
- Nov. 1 E. C. H. at Hartford. Ov't. Obs. impos. to 10^h at least.
 2 Partly clear. No A.B. to 7^h.
 3 Ov't. Obs. impos. to 8^h, and doubtless all night.
 4 Nearly clear, growing hazy. No A.B. to 10¹/₄^h.
 5 Ov't. Obs. impos. to 10^h, and doubtless all night. [seen.
 6 P'y cl'r 6^h to 7^h; soon after 7^h ov't, and thus to 10¹/₂^h at least: no A.B.
 7 Clear. No A.B. to 9^h.
 8 Ov't and rainy. Obs. impos. to 9^h, and probably all night.
 9 Clear. Moon. No A.B. seen to 9¹/₂^h. [no A.B.
 10 Clear. Moon. No A.B. seen to 9^h. At 5^h A.M. of 11th very cl'r, and
 11 M'y ov't to 7^h: moon: obs. impos.: within 7^h to 9^h: at 9^h ov't, and
 12 Ov't. Obs. impos. to 10^h at least. [obs. impos. to 10^h, p. all n't.
 13 Clear. Moon. No A.B. seen to 9^h.
 14 Clear. Moon. No A.B. seen to 9^h.
 15 Ov't. Obs. impos. to 9³/₄^h, and doubtless all night.
 16 Ov't and rainy. Obs. impos. to 9^h, and d's all night. [obs.
 17 M'y ov't: moon: within 7^h to 8^h: before, and after to 9^h, too cl'y for
 18 Mostly ov't. Moon. Obs. impos. to 10^h, and probably later.
 19 Much clouded. Moon. Obs. impos. to 9^h.
 20 Ov't. Obs. impos. to 9^h, and probably all night.
 21 Clear. Moon. No A.B. seen to 9¹/₂^h.
 22 Clear. Moon after about 8^h. No A.B. to 9^h.
 23 Mostly ov't. Obs. nearly or quite impos. to 9^h.
 24 Clear. Within from 7^h to 9^h. No A.B. to 9¹/₂^h. [impos. to 10^h.
 25 Cl'r to 7^h, no A.B.: m'y within 7^h to 9^h: aft. 9^h m'y ov't, and obs. n'y
 26 Ov't. Obs. impos. to 10^h, and probably all night.
 27 Partly clear. Did not watch personally.
 28 Ov't; drizzling rain. Obs. impos. to 10³/₄^h, and doubtless all night.
 29 Ov't and rainy. Obs. impos. to 11^h, and doubtless all night.
 30 Clear. No A.B. to 9^h.
- Dec. 1 Nearly clear. No A.B. to 7¹/₂^h.
 2 Ov't. Obs. impos. to 10^h, and probably all night.
 3 Ov't and rainy. Obs. impos. to 10¹/₂^h, and doubtless all night.
 4 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 5 Ov't and rainy. Obs. impos. to 9^h, and doubtless all night.
 6 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 7 Ov't. Obs. impos. to 9^h. Cleared up about 10^h.
 8 Clear. No A.B. to 10^h. Within from 7^h to 10^h.
 9 Ov't. Obs. impos. to 9^h at least.
 10 Cloudy early; after 8^h mostly clear. Moon. No A.B. seen to 9¹/₂^h.
 11 Ov't. Obs. impos. to 9³/₄^h at least.
 12 Cloudy. Obs. impos. to 9¹/₂^h at least.
 13 Clear. Moon. No A.B. seen to 9¹/₂^h.
 14 Partly clear. Moon. No A.B. seen to 9^h.
 15 Clear: moon: no A.B. seen to 9¹/₂^h: within 7^h to 9^h: ov't at 4^h A.M.
 16 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 17 Clear. Moon. No A.B. seen to 9^h.
 18 Clear. Moon. No A.B. seen to 9^h.
 19 Ov't. Obs. impos. to 10^h, and doubtless all night.
 20 Clear. Moon. No A.B. to 9¹/₄^h.

Oct. 29th.—Looking several times after, I saw no trace of it to 10^h.

1850.

- Dec. 21 Ov't. Obs. impos. to $9\frac{1}{2}^h$. About $9\frac{1}{2}^h$ clouds slightly broken.
 22 Ov't and raining. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.
 23 Ov't. Obs. impos. to $9\frac{1}{2}^h$, at which time sky clearing up.
 24 Clear. No A.B. to $9\frac{1}{2}^h$.
 * * * * * * * *
 27 Very clear. No A.B. to 9^h . Within doors most of evening.
 28 Ov't; snow and sleet. Obs. impos. to 9^h , and doubtless all night.
 29 Ov't. Obs. impos. to 9^h . At 6^h A.M. of 30th clear, and no A.B.
 30 Clear. No A.B. to 9^h , but at times slightly suspected.
 31 Ov't, but toward midnight a few stars oc'y vis.: obs. impos. to 12^h .

1851.

- Jan. 1 Sky very clear. No A.B. visible to 9^h .
 2 E. C. H. bet'n Bridgeport and N. Y.: cl'r: no A.B. to $9\frac{1}{2}^h$, or at 11^h .
 3 Ov't. Obs. impos. to 10^h , and doubtless all night.
 4 Very clear. No A.B. to $9\frac{1}{2}^h$, yet slightly suspected about $9\frac{1}{2}^h$.
 5 Ov't. Obs. impos. to 9^h , and p. all night. [10^h at least: no A.B.
 6 Cl'r early in ev'g to ab't 8^h , when growing hazy, and by 9^h ov't; so to
 7 Ov't to about 8^h , after which time clear. Moon. No A.B. to $9\frac{1}{4}^h$.
 8 Gradually cl'ding over, and by $8\frac{1}{2}^h$ wh'y ov't: obs. impos. to $9\frac{1}{2}^h$, d's
 9 Ov't and rainy. Obs. impos. to 10^h , and d's all night. [all night.
 10 Ov't. Obs. impos. to 9^h at least.
 11 Nearly clear to $7\frac{1}{2}^h$. Moon.* [most of ev'g.
 12 N'y cl'r; some cl'ds low in N: moon: no A.B. at $6\frac{1}{2}^h$ or $8\frac{1}{4}^h$: within
 13 Ov't. Moon. Obs. impos. to 9^h at least.
 14 Hazy. Moon. Obs. impos. to 9^h at least.
 15 Thinly ov't. Moon. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 16 Very hazy. Moon. Obs. impos. to 9^h , and doubtless all night.
 17 Ov't, clouds more or less broken. Moon. Obs. impos. to 9^h .
 18 Mostly clear. Moon. No A.B. to 9^h . [all night.
 19 At $6\frac{1}{2}^h$ cl'r, and no A.B.: within from $6\frac{1}{2}^h$ to 9^h : at 9^h ov't, and so d's
 20 Nearly clear, but hazy to a considerable altitude. No A.B. to 9^h .
 21 Clear. No A.B. to $9\frac{1}{2}^h$.* (400)
 22 Ov't. Obs. impos. to $10\frac{1}{4}^h$ at least.
 23 Clear. Slight A.B. about 7^h .* (401)
 24 Clear. No A.B. to $9\frac{1}{2}^h$.
 25 Clear. No A.B. to 9^h .
 26 Clear. No A.B. to $8\frac{1}{2}^h$.
 27 Clear. No A.B. to $8\frac{3}{4}^h$.*
 28 Ov't and rainy. Obs. impos. to 10^h , and doubtless all night.
 29 Clear. No A.B. to 9^h .
 30 Very clear. No A.B. to 9^h .
 31 Very clear. No A.B. to 9^h .
 Feb. 1 Ov't. Obs. impos. to 9^h , and probably all night.
 2 Clear. No A.B. to 9^h .
 3 Clear. No A.B. to 9^h , but some suspicions of a faint light about 9^h .
 4 Ov't. Obs. impos. to 9^h at least.
 5 Ov't. Obs. impos. to 10^h , and doubtless all night.
 6 Clear. Moon. No A.B. seen to 10^h , yet slightly suspected.
 7 Ov't. Obs. impos. to 10^h .

Jan. 11th.—Some slight suspicions of A.B. After 7^h 30m too cloudy for observation to 9^h at least.

Jan. 21st.—A single auroral streamer seen about 6^h 30m by Mr. Lyman Baird. It extended upward about 20° .

Jan. 23d.—Merely a low bank about 15° amplitude, for a short time. Saw no other auroral appearances during the evening to 9^h 30m, but did not watch closely.

Jan. 27th.—Although occasionally I slightly suspected a very faint light.

1851.

Feb.	8	Ov't. Obs. impos. to 9 ^h .	
	9	Ov't and misty. Obs. impos. to 9 ^h .	
	10	Ov't, misty and rainy. Obs. impos. to 9 ¹ / ₂ ^h , and d's all night.	
	11	Clear. Moon. No A.B. seen to 10 ^h .	
	12	Clear. Moon. No A.B. seen to 9.	
	13	Ov't. Obs. impos. to 9 ¹ / ₂ ^h .	
	14	Ov't and rainy. Obs. impos. to 10 ^h , and doubtless all night.	
	15	Ov't. Obs. impos. to 9 ¹ / ₂ ^h , and probably all night.	
	16	N'y cl'r: moon: no A.B. seen to 9 ^h , but cl'ds interf. to some extent.	
	17	Clear. No A.B. to 9 ^h .	
	18	Clear. A.B. all the evening.†	(402)
	19	Clear: about 9 ^h susp. a faint auroral light, otherwise no A.B. to 10 ^h .	
	20	Ov't and raining. Obs. impos. to 10 ^h , and doubtless all night.	
	21	Ov't and raining. Obs. impos. to 9 ^h , and doubtless all night.	
	22	Clear at high altitudes. Foggy. No A.B. seen to 9 ^h .	
	23	Clear. No A.B. about 9 ^h . Within doors at earlier hours.	
	24	Ov't. Obs. impos. to 9 ^h at least.	
	25	Clear. No A.B. to 9 ¹ / ₂ ^h .†	
	26	Much clouded in the N. No A.B. seen to 10 ^h , but obs. nec'y unc.†	
		* * * * *	
Oct.	1	Clear: moon: no A.B. seen 6 ¹ / ₂ ^h to 7 ^h , or at 9 ^h : within 7 ^h to 9 ^h .	
	2	Clear. Moon. A.B. as early as 9 ^h , and probably earlier.*	(408)
	3	Ov't. Obs. impos. to 10 ^h , and probably all night.	
	4	Clear. Moon. No A.B. to 8 ³ / ₄ ^h .	
	5	Ov't at 8 ^h , and obs. impos.	
	6	Clear, or nearly so. Moon. No A.B. to 9 ^h .	
	7	Clear. Moon. No A.B. seen to 9 ^h .	
	8	Clear, but somewhat hazy. Moon. No A.B. seen to 9 ^h .	
	9	Clear. Moon. No A.B. seen to 9 ¹ / ₂ ^h .	
	10	Clear. Moon. No A.B. seen to 9 ¹ / ₄ ^h .	
	11	Ov't to 9 ^h at least, and obs. impos.	
	12	Ov't and rainy. Obs. impos. to 8 ¹ / ₂ ^h , and doubtless all night.	
	13	Nearly clear. Moon. No A.B. seen to 9 ^h .	

Oct. 2d.—A low indistinct arch, and about 10^h some streamers.

† Near the close of February, 1851, Mr. Herrick was attacked by a fit of sickness so severe that it was not supposed that he could survive it. From this sickness he recovered very slowly. In August he was able to give partial attention to business, but his Journal was not resumed till October. The following record was left by Mr. Herrick upon a loose sheet. It is inferred that at least a portion of these observations could not have been made by him.

1851.

Feb.	18	Clear. Moon. Fine auroral arch at 7h, 3° or 4° high; continued to 9h 45m. Altitude 23°, and amplitude 120° to 130°. Sometimes there was more than one arch. At 10h 30m or 10h 45m the northern sky was filled with red streamers and white; so to 11h at least. Two-thirds of the sky was filled with auroral matter and streamers; could occasionally see an imperfect corona. Soon after 11h it subsided almost entirely. Did not look after this.	
	25	Clear. No A.B. to 10h 30m. A slight suspicion however.	
	28	Ov't to 9h, and probably later.	
March	7	Ov't and snowing at 8h; probably ov't during night.	
	12	Thinly ov't to 10h. No A.B. seen.	
	22	Clear. A general light low down about 8h 45m.	(403)
	28	Cl'r: A.B.; first noticed streamers at 9h 30m: no arch, not much light at 11h 30m.	(404)
	29	Clear. A.B., ill-defined arch 1° to 1° 30' high; only a few streamers at 9h.	(405)
	31	Clear. No A.B. at 10h 30m.	
April	28	Ov't to 10h.	
May	1	Broken clouds about 8h. Mr. E. W. Blake saw A.B. about 10h 30m to 11h; saw no streamers.	(406)
	7	Ov't to 10h.	
June	5	A.B. Arch 40° to 50° high.	(407)
	7	Ov't. Obs. impos. to 9h 30m.	

1851.

- Oct. 14 | E. C. H. at New York City. Clear. No A.B. seen to $9\frac{1}{2}^h$.
 15 | E. C. H. at Scranton, Pa. Clear. No A.B. to 9^h .
 16 | E. C. H. at Scranton, Pa. Clear. No A.B. to 9^h . [seen to 10^h .
 17 | E. C. H. on Erie R.R. from — to N.Y. City until $9\frac{1}{2}^h$: cl'r: no A.B.
 18 | Ov't and rainy. Obs. impos. to 9^h at least.
 19 | M'y ov't: cl'ring off about 9^h : obs. n'y impos. to 9^h : no A.B. seen.
 20 | Clear. A.B. all the evening from about $6\frac{1}{2}^h$.* (409)
 21 | M'y ov't, and N. entirely so. Obs. impos. to $9\frac{1}{2}^h$, and d's all night.
 22 | Ov't to about 9 ; from 9^h to 10^h clear, and no A.B.
 23 | Clear. A.B., not seen till about $8\frac{1}{2}^h$.* (410)
 24 | Nearly clear early in ev'g, and no A.B. to 8^h . At 9^h N. ov't.
 25 | Ov't. Obs. impos. to 9^h , and doubtless all night.
 26 | Ov't. Obs. impos. to 8^h , and doubtless all night.
 27 | Clear. No A.B. to 9^h .
 28 | Ov't. Obs. impos. to $9\frac{1}{2}^h$ at least.* (411)
 29 | Ov't, with sea-scud and other thin clouds. Obs. impos. to $9\frac{1}{2}^h$.
 30 | Ov't and rainy. Obs. impos. to 9^h , and doubtless later.
 31 | Clear. No A.B. seen to $9\frac{3}{4}^h$. Moon. [advances.
 Nov. 1 | Clear. Moon. No A.B. seen to 9^h . Sky becoming hazy as ev'g
 2 | P'y cl'r: moon: within $6\frac{1}{2}^h$ to 9^h : n'y ov't at $6\frac{1}{2}^h$, and 9^h to $9\frac{1}{2}^h$: no
 3 | Ov't. Obs. impos. to $9\frac{1}{2}^h$ at least. [A.B. seen to $9\frac{1}{2}^h$.
 4 | Ov't. Obs. impos. to $9\frac{1}{4}^h$ at least.
 5 | Ov't. Obs. impos. to $9\frac{1}{2}^h$ at least.
 6 |
 7 | E. C. H. at N.Y.: clear: moon: no A.B. seen at $7\frac{1}{2}^h$, or at $9\frac{1}{2}^h$ to $9\frac{3}{4}^h$.
 8 | Ov't. Obs. impos. to $9\frac{1}{2}^h$, and probably all night.
 9 | Ov't. Obs. impos. to 8^h , and doubtless all night.
 10 | Chiefly clear after about 7^h . Moon. No A.B. seen to 9^h .
 11 | Clear. Moon. No A.B. seen to $9\frac{1}{2}^h$.
 12 | Ov't. Obs. impos. to 10^h , and probably all night.
 13 | Ov't, oc'l openings in N.: no A.B. seen to 10^h ; aft. too cl'y for obs.
 14 | Ov't to 10^h at least. Obs. impos. Rain during night.
 15 | Ov't in N., but p'y cl'r in other quarters: obs. impos. to 10^h at least.
 16 | Ov't to about 8^h , when the N. was nearly clear. No A.B. seen.
 17 | Clear. No A.B. to 10^h .
 18 | Ov't. Obs. impos. to 10^h .
 19 | Clear. No A.B. to 10^h .
 20 | Cl'r ab't 6^h , and no A.B.: before 7^h ov't, and so to 11^h , and d's all n't.
 21 | N'y cl'r ab't 6^h , and no A.B.: entirely ov't $6\frac{1}{2}^h$ to 10^h , when the cl'ds
 22 | Mostly clear. No A.B. to 10^h . [were breaking away.
 23 | Ov't. Obs. impos. to 9^h at least.
 24 | Clear. No A.B. to 10^h .
 25 | Ov't and snowing. Obs. impos. to 10^h , and doubtless all night.
 26 | Clear. No A.B. to 10^h .
 27 | Partly clear. No A.B. seen to 10^h .
 28 | Mostly clear. Moon. No A.B. seen to 10^h .
 29 | Clear. Moon. No A.B. seen to 10^h .
 30 | Mostly clear. Moon. No A.B. seen to 10^h . Within from 7^h to 9^h .

Oct. 20th.—Amplitude 100° , more or less. Sundry streamers at about $7^h 30^m$, some 20° to 30° high; reddish in N.N.W., toward the horizon white light, bright. On the whole a fine display on a small scale.

Oct. 23d.—In general a low twilight illumination with few streamers. [Reported to me by Professor D. Olmsted. I did not see it.]

Oct. 28th.—Later than this the sky was partly clear, and a display of the A.B. was seen, at intervals, until dawn. Numerous streamers and undulations; no corona seen.

1851.

- Dec. 1 Clear. Moon. No A.B. seen to 10^h.
 2 Mostly clear. Moon. No A.B. seen to 9^h.
 3 Clear. Moon. No A.B. seen to 10^h.
 4 Ov't. Obs. impos. to 10^h, and probably all night.
 5 Mostly clear; some clouds in N. Moon. No A.B. seen to 10^h.
 6 Cloudless, but hazy. Moon. No A.B. seen to 9^h.
 7 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 8 Mostly clear. Moon. No A.B. seen to 10^h.
 9 Clear. Moon. No A.B. seen to 9¹/₂^h.
 10 Mostly ov't. Moon. Obs. impos. to 10^h.
 11 Clear. Moon after —. No A.B. seen to 9¹/₂^h.
 12 Ov't. Obs. impos. to 10^h at least.
 13 Clear after about 7^h. No A.B. to 10^h.
 14 Mostly ov't. Obs. impos. to 9^h, and probably all night.
 15 Ov't and snowing. Obs. impos. to 10^h, and probably much later.
 16 Clear. No A.B. to 9¹/₂^h.
 17 Clear. No A.B. to 9¹/₂^h.
 18 Clear. No A.B. to 10^h.
 19 Clear. No A.B. to 10^h.
 * * * * * * * *
 22 Ov't. Obs. impos. to 10^h, and doubtless all night.
 23 Mostly clear. No A.B. to 9¹/₂^h.
 24 Ov't. Snow early in evening. Obs. impos. to 10^h, and prob. later.
 25 Ov't and snowing. Obs. impos. to 10^h at least.
 26 Clear. No A.B. to 9¹/₂^h.
 27 Ov't. Moon. Obs. impos. to 9¹/₂^h.
 28 Ov't. Obs. impos. to 10^h, and doubtless all night.
 29 Mostly clear. Moon. No A.B. seen to 10^h.
 30 Mostly ov't. Moon.
 31 Ov't and raining. Obs. impos. to 10^h at least.

1852.

- Jan. 1 Clear. Moon. No A.B. seen to 10^h.
 2 Clear. Moon. No A.B. seen to 10^h.
 3 Ov't. Obs. impos. to 10^h, and doubtless all night.
 4 Ov't. Obs. impos. to 9^h, and doubtless all night.
 5 Ov't. Obs. impos. to 10^h, and probably all night.
 6 Ov't and snowing. Obs. impos. to 10^h, and doubtless all night.
 7 Clear. Moon. No A.B. seen to 9¹/₂^h.
 8 Partly clear. Moon. No A.B. seen to 10^h. Obs. imperfect.
 9 Ov't. Moon. Obs. impos. to 10^h.
 10 Ov't. Obs. impos. to 10^h.
 11 Ov't. Obs. impos. to 10^h.
 12 Mostly clear. No A.B. to 10^h.
 13 Ov't for an hour or so; clear after about 8^h, and no A.B. seen to 10^h.
 14 Ov't m'y to ab't 9^h: at 9¹/₂^h to 10^h m'y cl'r: susp. some auroral light.
 15 Cloudy early part of evening. Obs. impos. (?)
 16 Mostly clear after about 8^h. No A.B. to 9¹/₂^h.
 17 Mostly clear to about 8^h, after that becoming cloudy.
 18 Ov't and snowing. Obs. impos. to 9¹/₂^h, and doubtless all night.
 19 Clear. A.B. all night.* (412)
 20 Clear to about 9^h, after which becoming cl'y. No A.B. seen to 9^h.

Jan. 19th.—Mostly only an illumination along N. horizon, through amplitude of 100° to 120°, 5° and more high. About 1^h A.M. of 20th, a great display of streamers and red lights; more than half the sky filled with them, and southerly and southwesterly beyond the coronal point. At 5^h 30^m A.M. only low white light in N.

1852.

- Jan. 21 Mostly clear. No A.B. to 10^h.
 22 Cl'r: faint illumination, supposed to be auroral, but doubtful, to 9½^h.
 23 Clear. No A.B. to 9^h.
 24 Clear. No A.B. to 10^h.
 25 Clear. No A.B. to 9½^h.
 26 Clear. Moon. No A.B. seen to 10^h.
 27 Clear until about 8½^h. Moon. No A.B. seen.
 28 Ov't. Obs. impos. to 9½^h, and probably all night.
 29 M'y cl'r to about 9^h: moon: no A.B. seen: becoming cl'y about 9^h.
 30 Ov't. Obs. impos. to 10^h, and probably all night.
 31 Ov't; sleet falling sparingly. Obs. impos. to 9½^h, and d's all night.
- Feb. 1 Clearing up. Moon. No A.B. seen to 9^h, but obs. imperfect.
 2 Clear. Moon. No A.B. seen to 9^h.
 3 Clear. Moon. No A.B. seen to 9½^h.
 4 Clear. Moon. No A.B. seen to 9^h.
 5 Clear. Moon. No A.B. seen to 9½^h.
 6 Ov't. Obs. impos. to 10^h, and probably later.
 7 Clear. Moon. No A.B. at about 8^h.
 8 Clear. No A.B.
 9 Clear. No A.B. to 10^h.
 10 Ov't. Obs. impos. to 10^h, and doubtless all night.
 11 Ov't. Obs. impos. to 9^h, and probably later.
 12 Partly clouded. No A.B. seen to 10^h.
 13
 14 Clear. No A.B. to 9^h.
 15 Ov't. Obs. impos. to 10^h, and doubtless all night.
 16 Clear. Faint auroral dawn.* (413)
 17 Clear, no A.B. seen to about 8^h, when it was becoming cl'y.* (414)
 18 Clear. A.B. all the evening.* (415)
 19 Clear. A.B. all the evening, and probably all night.* (416)
 20 Clear. Slight A.B.* (417)
 21 Ov't. Obs. impos. to 10^h at least.
 22 P'y cl'r to ab't 7½^h, after ov't: no A.B. seen to 7½^h, after obs. impos.
 23 Ov't. Obs. impos. to 10^h, and prob. most of night. [seen to 9^h.
 24 P'y cl'r, but N. more or less obsc.: moon begins to interf.: no A.B.
 25 Clear. Moon. No A.B. seen to 10^h.
 26 Clear. Moon. No A.B. seen to 9½^h.
 27 Ov't to 10^h, and obs. impos.
 28 Ov't; snow and rain. Obs. impos. to 9^h, and all night.
 29 Mostly clear: moon: N. embarrassed by cl'ds: no A.B. seen to 9^h.
- Mar. 1 Ov't. Obs. impos. to 10^h, and doubtless all night.
 2 Clear. Moon. No A.B. seen to 9½^h.
 3 Clear. Moon. No A.B. seen to 10^h.
 4 Ov't. Obs. impos. to 10^h, and p. all night. [opportunity for obs.
 5 Embarrassed by flying cl'ds: moon: no A.B. seen to 9^h; but little
 6 Ov't. Obs. impos. to 9½^h at least. Cleared off during night.
 7 Clear. Moon. A.B. all the evening.* (418)
 8 Ov't. Obs. impos. to 9^h.

Feb. 16th.—About 7h 30m Mr. F. Bradley saw an auroral cloud in Ursa Major, narrow, and soon fading.

Feb. 17th.—About 4h A.M. of 18th, a display of the A.B. visible, of considerable splendor and extent.

Feb. 18th.—Not a great display; much general light and occasional streamers.

Feb. 19th.—A splendid display, and not often surpassed. About 7h, 10h 30m, and 1h, most remarkable, the heavens two-thirds full of pulsating auroral sheets and patches; some red light.

Feb. 20th.—A faint and limited illumination, with occasional streamers.

March 7th.—A clear but limited illumination reaching up 3° to 5°. I saw no streamers.

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- Mar. 9 Clear. Suspected faint auroral light to 10^h.* (419)
 10 Clear. No A.B. to 10^h.
 11 Clear. No A.B. to 10^h.
 12 Ov't, but beginning to clear off ab't 9^h: obs. n'y or quite impos. to 9^h.
 13 Mostly ov't to 9^h at least.
 14 Ov't and rainy. Obs. impos. to 9^h at least.
 15 Clear. No A.B. to 9^h.
 16 Clear. No A.B. to 10^h.
 17 Ov't and snowing. Obs. impos. to 10^h, and doubtless all night.
 18 Ov't. Obs. impos. to 10^h at least.
 19 Mostly ov't. Obs. nearly or quite impos. to 9½^h at least.
 20 Clear. No A.B. to 10^h.
 21 Ov't. Obs. impos. to 9^h, and probably all night.
 22 Ov't. Obs. impos. to 9½^h, and doubtless all night.
 23 Ov't. Obs. impos. to 9^h.
 24 Ov't. Obs. impos. to 10^h, and probably all night.
 25 Clear. Moon. No A.B. seen to 9^h.
 26 Ov't. Obs. impos. to 10^h, and probably all night.
 27 Ov't. Obs. impos. to 9^h, and probably much later.
 28 Clear. Moon. No A.B. seen at 9^h.
 29 Ov't early part of evening. About 9^h mostly clear, and no A.B.
 30 Ov't to 11^h, and probably all night.
 31 Ov't and rainy. Obs. impos. to 10^h, and doubtless later.
- April 1 Clear. Moon. No A.B. seen to 9½^h.
 2 Ov't with flying clouds. No opportunity for obs. to 9^h.
 3 Much clouded. Moon. No good obs. to 9^h.
 4 Ov't to 9^h, and doubtless all night.
 5 Ov't and snowing. Obs. impos. to 10^h, and probably all night.
 6 Ov't. Obs. impos. to 9½^h.
 7 Clear. No A.B. at 8½^h.
 8 Ov't. Obs. impos. to 9^h.
 9 Ov't. Obs. impos. to 9^h, and probably all night.
 10 Clear: slight A.B. at 9^h: a light on hor.; I saw no streamers. (420)
 11 Ov't. Obs. impos. to 10^h.
 12 Ov't. Obs. impos. to 10^h, and doubtless all night.
 13 Ov't most of evening. About 10^h clear, and no A.B.
 14 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 15 Ov't most of evening. About 10^h clear, and no A.B.
 16 Clear. No A.B. to 9¼^h, or but slightly suspected.
 17 Clear. No A.B. to 9^h.
 18 Ov't. Obs. impos. to 9^h, and doubtless all night.
 19 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 20 Ov't and rainy. Obs. impos. to 10^h, and doubtless all night.
 21 Mostly ov't, and obs. impos. to 9^h at least. Mostly ov't about 12^h.
 22 Mostly clear. A.B. all the evening; fine display at times. (421)
 23 Ov't. Obs. impos. to 9^h, and doubtless later.
 24 Clear. Moon. No A.B. seen to 9½^h.
 25 Ov't. Obs. impos. to 9^h.
 26 Ov't. Obs. impos. to 9^h, and doubtless later.
 27 Clear. Moon. No A.B. seen to 9^h.
 28 Clear. Moon. No A.B. seen at 9^h.
 29 Clear. Moon. No A.B. seen at 9^h.
 30 Ov't. Obs. impos. to 9^h.

March 9th.—Professor D. Olmsted states that there was a faint A.B., yet certain, about 8^h.

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- May 1 Ov't to 9^h at least.
 2 Clear. Moon. No A.B. at 8³/₄^h.
 3 Clear. Moon. No A.B. seen to 9^h.
 4 Clear. Moon. No A.B. seen to 8³/₄^h.
 5 Clear. No A.B. to 9^h.
 6 Clear. No A.B. to 9^h.
 7 Clear, but hazy about horizon. No A.B. to 9¹/₂^h.
 8 Cloudless, but hazy. No A.B. at 8³/₄^h.
 9 Clear after about 8¹/₂^h. No A.B. to 9^h.
 10 Clear. Slight A.B., hardly certain until about 9¹/₂^h.* (422)
 11 Nearly clear. No A.B. to 9¹/₂^h.
 12 Ov't. Obs. impos. to 9^h, and probably all night.
 13 Mostly ov't. Obs. nearly impos. to 10^h. No A.B. seen.
 14 Ov't. Obs. impos. to 9^h, and probably all night.
 15 Ov't. Obs. impos. to 10^h, and doubtless all night.
 16 Partly clear to about 9^h, and no A.B. After that becoming cl'y.
 17 Mostly ov't, and after about 9^h wholly so.* (423)
 18 Clear. A.B. all the evening.* (424)
 19 Sky embarrassed by clouds early part of evening.* (425)
 20 Mostly clear. A.B.* (426)
 21 Partly clouded. Slight A.B.; no streamers seen. (427)
 22 Mostly clear. No A.B. to 9¹/₂^h, but obs. necessarily imperfect.
 23 Mostly ov't, and obs. nearly impos. No A.B. seen to 9^h.
 24 No A.B. seen or suspected.
 25 Clear. Moon. No A.B. at 9^h.
 26 Ov't. Obs. impos. to 9¹/₂^h, and probably all night.
 27 Ov't. Obs. impos. to 9^h, and doubtless all night.
 28 Ov't. Obs. impos. to 9^h, and doubtless all night.
 29 Ov't. Obs. impos. to 9^h, and probably all night.
 30 Clear. Moon. No A.B. seen to 9^h.
 31 Nearly clear. Moon. No A.B. seen to 9^h, but obs. imperfect.
- June 1 M'y ov't: moon: obs. n'y or quite impos. to 9^h [to 10^h as reported.]
 2 E. C. H. at Lyme. Sky much clouded. No A.B. seen at 9^h.
 3 E. C. H. at Lyme. Sky partly clouded, and obs. n'y impos. to 9¹/₂^h.
 4 Much clouded. Obs. nearly impos. to 9¹/₂^h.
 5 Cl'r: slight A.B. ab't 9³/₄^h; several streamers 10° or 15° high. (428)
 6 Ov't at 9^h: obs. n'y impos.: A.B. strongly susp. by Mr. J. Edmands.
 7 Mostly ov't. At 10¹/₂^h nearly clear, and no A.B., as I am told.
 8 Ov't. Obs. impos. to 9¹/₂^h at least.
 9 Clear. No A.B. at 10^h.
 10 Clear. No A.B., as reported to me.* (429)
 11 Clear. A.B. all the evening.* (430)
 12 Clear. No A.B. at 9³/₄^h.
 13 Clear. Did not observe personally. No A.B., fide Mr. J. Edmands.
 14 Clear: no A.B. at 10¹/₂^h to 11^h, as reported to me: did not myself obs.

May 10th.—Then only a faint low light. About —h a few streamers 10° to 20° high, seen by others.

May 17th.—A.B., as I concluded, about 8h 45m; seen in clear spaces among clouds, almost beyond doubt.

May 18th.—General light, rather strong, but not extensive; in amplitude 60°, more or less, altitude 10°, more or less. No streamers seen.

May 19th.—After 10h sky more clear. A.B. general bright illumination. No streamers seen. I did not observe the A.B. myself.

May 20th.—General light and some streamers about 10h.

June 10th.—Mr. F. Bradley saw slight A.B. about 11h.

June 11th.—General light in the N. with some streamers, from an early hour to, say, about 9h. A serpentine belt from E. to W. from about 9h 30m to 9h 58m.

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June	15	Clear. A.B.*	(431)
	16	Clear chiefly about 10 ^h . A.B.*	(432)
	17	Ov't and showery. Obs. n'y or quite impos. to 10 ^h , and p. all night.*	
	18	Nearly clear. No A.B. to 10 ^h .	
	19	[to me: I did not obs. personally.]	
	20	Thunder shower 8 ^h to 9 ^h ; cl'ring aft. 9 ^h : no A.B. to 10 ^h , as reported	
	21	M'y cl'r: no A.B. to 10 ^h . Obs. by others, as I retired too early.	
	22	Clear. No A.B. to 10 ^h . Obs. by others.	
	23	Mostly clear. Moon. No A.B. to 10 ^h . Obs. by others.	
	24	Mostly ov't. Obs. n'y or quite impos. to 10 ^h . Cl'ed off in night.	
	25	Very clear: moon: no A.B. to 11 ^h , fide Mr. H. A. Newton: did not	
	26	Clear. Moon. No A.B. to 10 ^h . [obs. personally.]	
	27	Mostly ov't. Moon. Obs. nearly impos. at 10 ^h .	
	28	Clear. Moon. No A.B. seen to 10 ^h , as reported by others.	
	29	Mostly clear. Moon. No A.B. seen to 10 ^h , as reported by others.	
	30	Mostly clear. Moon. No A.B. seen to 10 ^h , as reported by others.	
July	1	Ov't. Obs. impos. to — ^h , and probably all night.	
	2	Clear. Moon. No A.B. to 10 ^h , as reported.	
	3	Ov't, almost wholly at 9 ³ / ₄ ^h , and obs. impos.	
	4	Mostly clear. No A.B., as reported, to 10 ^h .	
	5	Clear. No A.B., as reported, to 10 ^h .	
	6	Clear. A.B. about 10 ^h ; a low general light.*	(433)
	7	Mostly ov't. Obs. nearly impos. to 10 ^h .	
	8	Clear. No A.B. to 10 ^h .	
	9	Clear. A.B. about 10 ¹ / ₂ ^h , and probably earlier.*	(434)
		* * * * *	
	14	Ov't. Obs. impos. to 10 ^h , and probably most of the night.	
	15	Clear. No A.B. at 10 ^h .	
	16	Ov't. Obs. impos. to 10 ^h , and doubtless all night.	
	17	Mostly clear. Did not obs. personally. No A.B., as reported to me.	
	18	Cl'r: did not obs. personally: no A.B., as reported to me: at 2 ^h A.M.	
		* * * * * [clear, and no A.B.]	
	21	Clear. Moon.	
	22	Clear. Moon.	
	23	Clear. Moon.	
	24	Mostly clear. Moon. No A.B. seen.	
	25	No A.B. seen.	
	26	Clear. Moon. No A.B. seen at 9 ¹ / ₂ ^h .	
	27	Clear. Moon.	
	28	Clear. Moon.	
	29	Ov't. Obs. impos. to 10 ^h , and doubtless all night.	
	30	Ov't. Obs. impos. to 10 ^h .	
	31	Ov't. Obs. impos. to 10 ^h , supposed.	
Aug.	1	Ov't at 9 ^h , and obs. impos.: at 2 ^h A.M. of 2d cl'r: moon, and no A.B.	
	2	Considerably clouded. Moon. Obs. at 9 ^h nearly impos.	
	3	Very clear. No A.B. to 9 ^h .	
	4	Ov't. Obs. impos. to 9 ^h , and doubtless all night. Rain.	
	5		
	6	Ov't. Obs. impos. at 10 ^h , and probably all night.	

June 15th.—A general illumination, amplitude 100°, and altitude 25°, more or less; few streamers if any.

June 16th.—General light, and sundry streamers reaching up 20°, more or less.

June 17th.—Suspensions of A.B. through crevices and thin spots in the clouds.

July 6th.—Professor D. Olmsted saw a few streamers.

July 9th.—An illumination on horizon, not extending upward more than 10° (fide Mr. J. Edmands). Did not observe personally.

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- Aug. 7 Clear. No obs. by myself. No A.B., as reported.
 8 Clear. No A.B. to 9^h.
 9 P'y cl'r: no obs. by myself. Almost entirely ov't during night.
 10 Ov't and rainy. Obs. impos. all night.
 11 Cl'r: slight A.B., a simple dawn: at 3^h A.M., same appearance. (435)
 12 Clear. No A.B. to 10^h, as reported. Did not observe personally.
 13 Mostly clear. No A.B. to 9^h, as reported.
 14 Clear. No A.B. to 9^h, or to 10^h, as reported.
 15 Clear. No A.B. to 9^h.
 16 Ov't. Obs. nearly or quite impos. to 9^h, and probably all night.
 17 Partly clear. No A.B. to 8½^h, but obs. embarrassed by clouds.
 18 Clear. No obs. by myself.
 19 Clear but hazy, especially about horizon. No obs. personally.
 20 Ov't. Obs. impos. to 8½^h at least.
 21 Mostly ov't to 8^h at least.
 22 Clear. Moon. No A.B. seen to 8½^h.
 23 Mostly clear. Moon. No A.B. seen at 9^h.
 24 Ov't to 8¾^h, and probably all night. Obs. impos.
 25 Ov't. Obs. impos. to 8^h, and probably all night.
 26 Ov't. Obs. impos. to 9^h, and probably all night.
 27 Thinly ov't. Moon. Obs. nearly or quite impos.
 28 Ov't and rainy. Obs. impos. to 9^h, and doubtless all night.
 29 Ov't. Obs. impos. to 9^h, and d's all night. Rain in the night.
 30 Mostly clear to 8½^h, and no A.B. At 9^h ov't. Moon.
 31 Clear. Moon. No A.B. seen to 9^h.
 Sept. 1 Clear. Moon. No A.B. to 9^h.
 2 Clear. No A.B. to 9^h.
 3 Ov't and rainy. Obs. nearly or quite impos. to 9^h at least.
 4 Clear. A.B. reported to me, but doubtful.
 5 Clear. No A.B. to 9^h.
 6 Clear: no A.B. to 8½^h: slight display of A.B. bet'n 9^h and 10^h. (436)
 7 Clear. No A.B. to 8½^h.
 8
 9 Clear. No obs.
 10 Ov't.
 11 Ov't. Obs. impos. to 10^h, and probably all night.
 12 Clear. No A.B. to 8½^h.
 13 Very clear. No A.B. to 9^h, but suspected.
 14 Ov't. Obs. impos. to 8½^h, and probably all night.
 15 Considerably obscured. No A.B. seen to 9^h.
 16 Clear. Slight A.B.* (437)
 17 Clear. Moon. Slight A.B. No streamers seen. (438)
 18 Partly clear. Moon. No A.B. to 8½^h.
 19 Partly clear. Moon. No A.B. to 8½^h.* (439)
 20 Much clouded. Moon. Obs. nearly impos. to 8½^h at least.
 21 Broken clouds. A.B. between 11½^h and 11¾^h.* (440)
 22 Clear. Moon. No A.B. seen to 9^h.
 23 Clear. Moon. No A.B. seen to 9^h.
 24 Mostly clouded. Moon. About 10^h clear, and no A.B.
 25 Ov't. Obs. impos.
 26 Clear. Moon. No A.B. seen to 9^h.

Sept. 16th.—A few streamers seen about 7^h; after that, a low light.

Sept. 19th.—A slight A.B. about midnight reported by Professor D. Olmsted.

Sept. 21st.—A few streamers about 10° high.

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Sept.	27	Ov't; rainy 8 ^h to 9 ^h . Obs. impos. to 9 ^h , and probably all night.	
	28	Mostly ov't. Obs. mostly impos.	
	29	Clear. Moon. A.B. about 7 ¹ / ₂ ^h .*	(441)
	30	M'y ov't: no A.B. seen to 8 ¹ / ₂ ^h , but much of time obs. embarrassed by	
Oct.	1	Mostly clear. No A.B. seen to 8 ¹ / ₂ ^h .	[clouds.
	2	Clear. No A.B. at 7 ^h 25 ^m .	
	3	Mostly ov't, and entirely so at 8 ¹ / ₂ ^h .	
	4		
	5	Clear. A.B. most of the evening.*	(442)
	6	Clear. No A.B. to 9 ^h .	
	7	Ov't. Obs. impos. to 9 ^h , and probably all night.	
	8	Mostly clear. No A.B. to 9 ^h , or at 10 ¹ / ₂ ^h .	
	9	Ov't and rainy. Obs. impos. to 9 ^h , and doubtless all night.	
	10	Ov't to 10 ^h at least, and obs. impos.	
	11	Clear. No A.B. to 9 ^h .	
	12	Much clouded. No A.B. seen to 9 ^h .	
	13	Much clouded. No A.B. seen to 9 ^h . Ov't next morning.	
	14	Ov't and rainy. Obs. impos. to 9 ^h , and doubtless all night.	
	15	Much clouded. Obs. necessarily imperfect. No A.B. at 8 ^h .	
	16		
	17	Ov't and rainy. Obs. impos. to 9 ^h , and doubtless much later.	
	18	Ov't. Obs. impos. to 9 ^h at least.	
	19	Partly clear before 7 ^h , and after 8 ¹ / ₂ ^h . Moon.* No A.B.	(443)
	20	Clear. Moon.*	(444)
	21	Much clouded. Moon.*	
	22	Partly clear. Moon. No A.B. seen to 9 ^h .	
	23	Clear. Moon. No A.B. seen to 9 ^h .	
	24	Clear. Moon. No A.B. seen to 9 ^h .	
	25	Cl'y ab't the N. early in ev'g; after that n'y cl'r. Moon. No A.B.	
	26	Clear. No A.B. to 9 ^h .	
	27	Ov't. Obs. impos. to 9 ^h , and probably all night.	
	28	Mostly ov't. Moon. Obs. nearly impos.	
	29	Ov't. Obs. impos.	
	30	Ov't. Obs. impos. to 9 ^h , and probably all night.	
	31	Ov't. Obs. impos. to 8 ¹ / ₂ ^h , and probably all night.	
Nov.	1	Ov't. Obs. impos. to 9 ^h , and doubtless all night.	
	2	Ov't and rainy early in ev'g: cl'ed up bet'n 7 ^h and 8 ^h , and remained.	
	3	Clear. No A.B. to 9 ^h .	
	4	Clear. No A.B. to 9 ^h .	
	5	Partly clear early in the evening. Obs. impos.	
	6	Ov't and rainy. Obs. impos. to 9 ^h , and doubtless all night.	
	7	Clear. No A.B. to 9 ^h .	
	8	Mostly ov't. Obs. nearly impos. to 9 ^h at least. No A.B. seen.	
	9	Ov't. Obs. impos. to 9 ^h , and doubtless later.	
	10	Mostly clear. No A.B. to 8 ^h .*	(445)
	11	Clear. E. C. H. at New London, Ct.*	(446)

Sept. 29th.—An arch about 100° amplitude, 10° or 15° high at vertex. I saw no streamers, and after about 8^h I could not see the aurora.

Oct. 5th.—Many streamers, perhaps 10° high. Seen chiefly between 7^h and 9^h.

Oct. 19th.—At 11^h and after, A.B., 45° to 60° in amplitude, low on horizon. Reported by Mr. H. A. Newton.

Oct. 20th.—Auroral streamers about 9^h (none seen before), bright and extending up 10° or 15°.

Oct. 21st.—Some suspicions of A.B., but very uncertain to 9^h.

Nov. 10th.—A.B. about 9^h; amplitude 30° or 40°, streamers extending 8° or 10° high. Fide Mr. H. A. Newton.

Nov. 11th.—A.B. from 7^h to 11^h, amplitude 110° or 120°, general light, no streamers seen. [Mr. H. A. Newton.]

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- Nov. 12 Clear. No A.B. seen until about 11^h.* (447)
 13 Ov't. Obs. impos. to 9^h, and probably all night.
 14 Much cl'ded, and obs. therefore imperf. No A.B. seen to 8^h.* (448)
 15 Mostly clear, except clouds on N. horizon. No A.B. seen to 9^h.
 16 Ov't.
 17 Ov't. Obs. impos. to 8^h, and probably all night.
 18 Ov't. Obs. impos. to 9^h, and probably all night.
 19 Ov't. Obs. impos. to 9^h, and probably all night.
 20 Ov't to about 8^h. Clearing up about 9^h.
 21 Clear. Moon. No A.B. seen to 8½^h. At 5^h A.M. of 22d cl'r, no A.B.
 22 Ov't; hail ab't 7^h, ending in rain. Obs. impos. to 9^h, and d's all n't.
 23 Ov't. Obs. impos. to 9^h at least. Cleared up during the night.
 24 Clear. Moon. No A.B. seen to 9^h.
 25 Much clouded. Moon. No A.B. seen to 8½^h.
 26 Ov't and rainy. Obs. impos. to 9½^h, and doubtless all night.
 27 Clear. Moon. No A.B. seen to 9^h.
 28 Clear. Moon rose about —^h. No A.B. I did not obs. personally.
 29 Partly clouded. No A.B. seen to 7^h.
 30 Clear. No A.B. to 8^h.
 Dec. 1 Clear. No A.B. to 8½^h.
 2 Clear. No A.B. to 9^h.
 3 Ov't. Obs. impos. to 10^h, and doubtless all night.
 4 Ov't. Obs. impos. to 9^h, and doubtless all night.
 5 Chiefly clear.* (449)
 6 Mostly clear. No A.B. to 9^h.
 7 Ov't. Obs. impos. to 11^h, and doubtless later.
 8 Clear. No A.B. to 9^h.
 9 Ov't. Obs. impos. to 8^h, and doubtless all night.
 10 Ov't. Obs. impos. to 9^h, and doubtless all night.
 11 Ov't. Obs. impos. to 9^h, and probably all night.
 12 Cloudy in part. At about 8^h clear, and no A.B.
 13 M'y clear. No A.B. [Twilight A.B. (Mr. H. A. Newton.)] (450)
 14 Clear. Moon. No A.B. to 9^h.
 15 Clear. Moon. No A.B. to 9^h.
 16 Ov't. Obs. impos. to 9^h, and doubtless all night.
 17 Ov't and misty early part of the evening. A.B. 10^h to 11^h. (451)
 18 Clear. Moon. No A.B.
 19 Partly clear to about 8^h.
 20 Ov't. Obs. impos. to 9^h, and doubtless all night.
 21 Mostly clear. Moon. No A.B. at 8^h.
 22 Cloudy in N. Moon. Obs. nearly or quite impos. to 9^h at least.
 23 Ov't and rainy. Obs. impos. to 9^h, and doubtless all night.
 24 Ov't and rainy. Obs. impos., doubtless all night.
 25 Ov't. Obs. impos. to 9^h, and doubtless all night.
 26 Ov't. Obs. impos. to 8^h at least. Cleared off during the night.
 27 Ov't. Obs. impos. to 10^h, and doubtless all night.
 28 Partly clear. Moon. No A.B. seen to 9^h. Obs. uncertain.
 29 Mostly clear. Moon. No A.B. seen to 9^h. Obs. uncertain.*
 30 Much clouded. About 8^h nearly clear in N. and N.W., and no A.B.
 31

Nov. 12th.—A.B. seen between 11^h and 12^h, and also about 1^h A.M. of 13th; a few streamers, but not much display. From midnight to dawn, more or less cloudy.

Nov. 14th.—Slight A.B. about 1^h A.M. of 15th. Fide Professor D. Olmsted.

Dec. 5th.—Slight A.B., extending perhaps 2° or 3° above horizon. No streamers to 9^h.

Dec. 29th.—A.B. seen near Hartford by Mr. H. A. Newton; streamers.

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- Jan. 1 Ov't to about 8^h, thence clear. No A.B.
 2 Ov't at 6¹/₂^h.
 3 Ov't. Obs. impos. to 9^h, and doubtless all night.
 4 Ov't. Obs. impos. to 10^h, and doubtless all night.
 5 Clear. No A.B. to 9^h.
 6 Clear. No A.B. to 9^h.* (452)
 7 Clear. No A.B. at 8^h.
 8 Clear. No A.B. to 9^h.
 9 Clear. No A.B. to 9^h.
 10 Mostly ov't. No A.B. seen to 9^h.
 11 Ov't. Obs. impos. to 9^h, and doubtless all night.
 12 Ov't and snowing. Obs. impos. to 10^h, and doubtless all night.
 13 Ov't. Obs. impos.
 14 Mostly ov't. Obs. impos.
 15 Ov't. Obs. impos.
 16 Clear. Moon. No A.B. at 8^h.
 17 Mostly clear. Moon. No A.B. seen about 8^h.
 18 Ov't. Obs. impos. to 10^h, and probably most of night.
 19 Clear. Moon. No A.B. seen to 9^h.
 20
 21 Clear. Moon. No A.B. seen to 9^h.
 22 Ov't. Obs. impos. to 9^h.
 23 Ov't. Obs. impos. to 9^h.
 24 Ov't. Obs. impos. to 9^h.
 25 Ov't and snowing. Obs. impos. to 9^h.
 26 Clear. Moon. No A.B. to 8¹/₂^h.
 27 Clear. No A.B. to 9^h.
 28 Clear. No A.B. to 9^h.
 29 Much clouded. No A.B. at 8^h.
 30 Clear. No A.B. to 8^h.
 31 Ov't. Obs. impos. to 9^h.
 Feb. 1 Ov't. Obs. impos. to 9^h, and doubtless all night.
 2 Ov't and rainy. Obs. impos. to 9^h.
 3 Clear. No A.B. to 9^h.
 4 Ov't. Obs. impos. to 10^h, and doubtless all night.
 5 Ov't. Obs. impos. to 9^h, and doubtless all night.
 6 Ov't and rainy to 8^h, and doubtless all night.
 7 Ov't to 8¹/₂^h, when it began to clear: obs. impos. to 8¹/₂^h: no A.B. seen
 8 Mostly clear. No A.B. to 9^h. [after, as I am informed.
 9 Clear. No A.B. to 9^h.
 10 Ov't; some rain. Obs. impos. to 9^h, and doubtless all night.
 11 Clear. Moon. No A.B. seen to 9^h.
 12 Ov't. Obs. impos. to 9^h at least.
 13 Clear. Moon. No A.B. seen to 9^h.
 14 Clear. Moon. No A.B. seen about 8^h. (453)
 15 M'y ov't: moon: obs. n'y or quite impos. to 10^h, and p. all night.
 16 Ov't. Obs. impos. to 9^h, and doubtless later.
 17 Clear. Moon. No A.B. seen to 9^h.
 18 Ov't. Obs. impos. to 9^h, and doubtless all night.
 19 Ov't. Obs. impos. to 9^h, and probably later.
 20 Partly clear. Moon. No A.B. seen to 9^h.

Jan. 6th.—Auroral arch in N. about 1^h A.M. of 7th. [Fide Professor D. Olmsted.]Feb. 14th.—Later, about 10^h to 10^h 15^m, a display of the A.B. was seen: a low arch, and some bright streamers, extending perhaps 20° high.

1853.

- Feb. 21 Clear. Moon. No A.B. seen to 8½^h.
 22 Ov't. Obs. impos. to 9^h.
 23 Ov't.
 24 Mostly clear. Moon. No A.B. seen to 9^h.
 25 Clear. Moon after about 8^h. No A.B.
 26 Clear. No A.B. to 8^h.
 27 Mostly clear, growing hazy. No A.B. to 9^h.
 28 Ov't. Obs. impos. to 9^h, and probably all night.
- Mar. 1 Ov't and rainy. Obs. impos. to 10^h, and probably all night.
 2 Ov't. Obs. impos. to 9^h, and doubtless later.
 3 Clear. No A.B. about 8^h.
 4 Ov't and snowing. Obs. impos. to 9^h, and doubtless all night.
 5 Clear. No A.B. to 9^h.
 6 Clear. No A.B. at 9^h or 10^h.
 7 Ov't. Obs. impos. to 9^h, and doubtless all night.
 8 Ov't. Obs. impos. to 9^h, and doubtless all night.
 9 Mostly clear.
 10 Clear.
 11 Ov't. Obs. impos. to 9^h, and doubtless all night.
 12 Mostly ov't. Clouds breaking up about 9^h. Obs. impos.
 13 Much clouded.
 14 Partly clear. Moon. No A.B. seen, but obs. embarrassed by cl'ds.
 15 Clear. Moon. No A.B. seen to 9^h.
 16 Ov't. Obs. impos. to 9^h at least.
 17 Mostly clear. Moon. No A.B. seen to 9^h.
 18
 19 Clear. Moon. No A.B. seen after 9^h.
 20 Mostly ov't in N. Moon. Obs. impos. at 8^h.
 21 P'y cl'r, but N. more or less obst. by cl'ds: moon: no A.B. seen to 9^h.
 22 P'y cl'r, but N. more or less obst. by cl'ds: moon: no A.B. seen to 9^h.
 23 P'y cl'r, but N. more or less obst. by cl'ds: moon: no A.B. seen to 9^h.
 * * * * * * * *
 26 Ov't. Obs. impos. to 9^h, and probably later.
 27 Mostly clear. Slight A.B.; no streamers seen to 8½^h. (454)
 28 Clear, except cloud along N. horizon. No A.B. to 9^h.
 29 Clear. No A.B. at 8^h.
 30 Clear. No A.B. at 9^h. [Fide Mr. J. Edmands.]
 31 Ov't. Obs. impos. to 9^h, and probably all night.
- Apr. 1 Clear. No A.B. to 9^h.
 2 Clear. No A.B. to 9^h.
 3 Ov't; rainy. Obs. impos. to 9^h, and doubtless all night.
 4 Ov't, rainy, with thunder. Obs. impos. to 9^h, and d's all night.
 5 Clear. A.B. seen at various times to 10¼^h at least.* (455)
 6 Clouded early part of evening.* (456)
 7 Clear. No A.B. to 10^h.
 8 Clear. No A.B. to 9^h.
 9 Clear. No A.B. to 9^h.
 10 Chiefly clear. Slight suspicions of A.B.* (457)
 11 Clear. No A.B. to 9^h.
 12 Ov't. Obs. impos. to 9^h.

April 5th.—Amplitude 90°, more or less, altitude 8° to 12°. Some streamers. Illumination moderately bright.

April 6th.—Between 9^h and 10^h A.B., less than on previous night, yet distinct. Amplitude 50°, more or less.

April 10th.—A.B. certain (fide Mr. J. Edmands), but not very extensive, at 10^h or later.

1853.

Apr.	13	Ov't. Obs. impos. to 9 ^h .	
	14	Ov't and rainy. Obs. impos.	
	15	Clear. Moon. No A.B. seen to 9 ^h .	
		* * * * *	
	20	Ov't. Obs. impos. to 9 ^h , after that clearing up. Moon.	
	21	Clear. Moon. No A.B. seen to 9 ^h .	
	22	Ov't and rainy. Thunder shower about 7 ^h . Obs. impos. to 9 ^h .	
	23	Clear. Moon. No A.B. at 8 ^h .	
	24	Ov't. Obs. impos. to 8½ ^h , and doubtless all night.	
	25	Ov't. Obs. impos. to 9 ^h , and probably all night.	
	26	Clear. No A.B. to 9½ ^h .	
	27	Clear. No A.B. to 8½ ^h .	
	28	Clear. No obs. after 8 ^h .	
	29	Ov't. Obs. impos. to 8½ ^h .	
	30	Clear. No A.B. at 8½ ^h .	
May	1	Clear. No A.B. to 9½ ^h .	
	2	Clear. A.B., a considerable display.*	(458)
	3	Nearly clear; hazy about N. No A.B. to 9 ^h , but slightly susp.	
	4	Much clouded. Obs. nearly impos. to 8½ ^h at least.	
	5	Ov't and rainy. Obs. impos. to 9 ^h , and doubtless all night.	
	6	Clear at 9 ^h . No A.B. then.	
	7	Ov't. Obs. impos. to 9 ^h , and probably all night.	
	8	Ov't. Obs. impos. to 9 ^h .	
	9	Clear. No A.B. at 9 ^h .	
	10	Ov't. Obs. impos. to 9 ^h at least.	
	11	Clear. No A.B. at 9 ^h .	
	12	Mostly ov't. Moon. Obs. nearly impos. to 9 ^h .	
	13	Clear. Moon. A.B.*	(459)
		* * * * *	
	16	Hazy. Moon. Obs. nearly impos. to 9 ^h .	
	17	Hazy and cloudy. Moon. Obs. nearly impos. to 9 ^h .	
	18	Clear. Moon. No A.B. seen at 9½ ^h .	
	19	Ov't, chiefly. Obs. impos. to 8¼ ^h .	
	20	Clear. Moon. No A.B. to 9 ^h .	
	21	Hazy. Moon. No A.B. to 9¼ ^h .	
	22	Clear. No obs.	
	23	Ov't. Obs. impos. to 9 ^h at least, and probably all night.	
	24	Ov't and rainy. Obs. impos. to 9½ ^h , and doubtless all night.	
	25	Ov't. Obs. impos. to 9 ^h , and doubtless all night.	
	26	Ov't for the most part. Obs. impos to 9 ^h , and probably all night.	
	27	Cloudless, but hazy. No A.B. to 9½ ^h .	
	28	Hazy. No A.B. seen to 8 ^h ; insufficient obs.	
	29	Hazy. No A.B. to 9¼ ^h .	
	30	Ov't.	
	31	Clear. No A.B. to 10½ ^h .*	(460)
June	1	Clear. A.B. about 10 ^h .*	(461)
	2	Ov't. Obs. impos. to 9 ^h , and doubtless all night.	
	3	Ov't. Obs. impos. to 9 ^h , and doubtless most of night.	
	4	Ov't. Obs. impos. to 9 ^h , and probably later.	

May 2d.—Amplitude 100° to 120°, arch in N. 25° to 30° high at vertex, many streamers, not very bright, some reaching up to 75° or 80° altitude. Observed from 8h 45m to 9h; did not look after this.

May 13th.—Not very conspicuous, but certain. [Fide Mr. Lyman Baird.]

May 31st.—At about 11h, I was quite sure that there was an auroral light in the N.

June 1st.—A low light 70° to 90° amplitude, and 5°, more or less, elevation. I saw no streamers.

1853.

June	5	Mostly ov't. Obs. impos. to $9\frac{1}{4}^h$ at least.	[no A.B.]					
	6	Clear. I did not observe, but a friend states that at 10^h there was						
	7	Ov't. Obs. impos. to $9\frac{1}{2}^h$ at least.						
		* * * * *						
	11	Clear. Moon. No A.B. at 9^h to $9\frac{1}{4}^h$.						
	12	Clear. Moon. No obs. after 9^h .						
	13	Ov't. Obs. impos. at $9\frac{1}{2}^h$.						
		* * * * *						
	17	Ov't. Obs. impos. to $9\frac{1}{2}^h$ at least.						
	18	Moon. Supposed clear.						
July	19	Ov't.						
	20	Clear. Moon. No A.B. to $9\frac{1}{4}^h$.						
	21	Ov't. Obs. impos. to $9\frac{1}{2}^h$.						
	22	Clear, in part. No obs., and probably too cloudy.						
	23	Ov't. Obs. impos.						
	24	Clear. No A.B. at 9^h .						
	25	Clear. No A.B. at $9\frac{1}{2}^h$.						
	26	Mostly ov't. Obs. nearly impos. to 9^h at least, and p. all night.						
	27	Ov't and raining. Obs. impos. to 9^h , and doubtless most of night.						
	28	Clear. No A.B. at $9\frac{3}{4}^h$.						
	29	Mostly ov't. Obs. impos. to $9\frac{1}{2}^h$.						
	30	Much clouded. No obs. after 9^h .						
	1	Partly cloudy. No A.B. to $9\frac{1}{2}^h$.						
	2	Mostly clear. No obs.						
	3	Ov't. Obs. impos. to 9^h , and probably all night.						
	4	Mostly clear. No A.B. to $9\frac{1}{2}^h$.						
	5	Clear. No A.B. at $9\frac{3}{4}^h$.						
	6	Clear. No A.B. at $9\frac{1}{2}^h$.						
	7	Mostly clear. No A.B. at $9\frac{1}{4}^h$.						
	8	Partly cloudy. No A.B. seen at $9\frac{1}{2}^h$.						
	9	Rainy most of ev'g. Clearing up between 9^h and 10^h . No obs.						
	10	Partly clear.						
	11	Mostly ov't. Moon. Obs. impos. to $9\frac{1}{4}^h$, and probably all night.						
	12	Mostly clear. Moon. A.B., some general display.*	(462)					
	13	Partly clear. Moon. No A.B. seen to $9\frac{1}{4}^h$.						
	14	Clear. Moon. No A.B.						
	15	Ov't. Obs. impos. to $9\frac{1}{2}^h$, and doubtless all night.						
		* * * * *						
	18	Ov't.						
	19	Ov't.						
	20	Nearly clear. Moon. Somewhat hazy.						
	21							
	22	Much clouded. Moon rose about $9\frac{1}{2}^h$.*						
	23	Ov't and rainy.						
		* * * * *						
	30	Ov't, almost wholly.						
	31	Nearly clear. No A.B. to $9\frac{1}{2}^h$.						
Aug.	1	Ov't and rainy. Obs. impos., probably all night.						
	2	Ov't. Obs. impos. to 9^h , and doubtless later.						
	3	Ov't. Obs. impos. to 9^h , and doubtless all night.						
	4	Clear. No A.B. to $9\frac{1}{2}^h$.						

July 12th.—Between 11^h and 12^h , a narrow arch or belt spanned the heavens from E. to W. See a description by Mr. H. A. Newton, *New Haven Morning Journal*, July 14th.
 July 22d.—Slight suspicions of A.B., but probably due to moonlight.

1853.

- Aug. 5 M'y ov't: obs. impos. to 9^h: bet'n 9^h and 10^h m'y clear, and no A.B.:
 6 Ov't. Obs. impos. to 9^h, and p. all night. [fide Mr. J. Edmands.
 7 Ov't. Obs. impos. to 9^h, and doubtless all night.
 8 Ov't and showery. Obs. impos. to 9^h.
 9 Ov't almost entirely up to 2^h A.M. of 10th.*
 10 Clear. Moon. No obs. until about 10³/₄^h. No A.B. then.* (463)
 11 Clear. Moon. No A.B. seen to 8¹/₂^h.
 12 Clear. Moon. No A.B. seen to 9^h.
 13 Clear. Moon. No A.B. seen to 9^h.
 14 Ov't and showery. Obs. impos. to 9¹/₂^h at least.
 15 Ov't. Obs. impos. to 9^h.
 16 Ov't. Obs. impos. to 9^h.
 17 Ov't. Obs. impos. to 9^h, and doubtless all night.
 18 Mostly ov't. Obs. impos. to 9^h, and probably most of the night.
 19 Clear. Did not personally observe. No A.B. to 9^h.
 20 Clear. Did not personally observe. No A.B. to 9^h.
 21 Clear. No A.B. to 9^h.
 22 Clear. (?)
 23 Clear. No A.B. to 9^h.
 24 E. C. H. at Danbury, Ct. Raining to 9¹/₂^h at least, and obs. impos.
 25 Mostly ov't. Obs. impos. to 9¹/₂^h.
 26 Clear. No A.B. to 9¹/₂^h.
 27 Ov't and r'y to 10¹/₂^h at least: obs. impos.: E.C.H. at Hartford to 8¹/₂^h.
 28 Clear. No A.B. to 9^h.
 29 Clear. No A.B. to 9^h.
 30 Mostly clear. No A.B. to 9^h.
 31 Ov't. Obs. impos. to 9^h, and probably all night.
- Sept. 1 Clear. A.B.* (464)
 2 Clear. A.B., many streamers extending to alt. of 40°.* (465)
 3 Almost wholly ov't. Obs. impos. to 9^h at least.
 4 Nearly clear. No A.B. to 9¹/₂^h.
 5 Clear to about 8³/₄^h, aft. ov't to 10^h, and p. all night. No A.B. to 8³/₄^h.
 6 Clear. No A.B. to 9¹/₄^h.
 7 Mostly clear. No A.B. to 9^h. Moon begins to interfere.
 8 Clear. No A.B. seen to 9^h.
 9 Ov't. Obs. impos. to 9^h, and doubtless all night.
 10 Clear. Moon. No A.B. seen to 8¹/₂^h.
 11 Clear. Moon. No A.B. seen to 8¹/₂^h.
 12 Clear. Moon. No A.B. seen to 9^h.
 13 M'y cl'r to 9^h, after ov't: moon: no A.B. seen, and obs. n'y impos.
 14 Ov't. Obs. impos. to 9^h, and doubtless all night.
 15 Mostly ov't. Obs. impos. to 9^h, when clouds began to break up.
 16 Ov't. Obs. impos. to 9^h at least.
 17 Ov't. Obs. impos. to 9^h at least, and probably all night.
 18 Ov't chiefly. Moon. Obs. nearly or quite impossible to 10^h.
 19 Clear. Moon. No A.B. seen to 9^h.
 20 Ov't; rain latter part of ev'g. Obs. impos. to 9^h, and p. all night.
 21 Partly clear. No A.B. seen to 9^h.

Aug. 9th.—Clouded also at about 2^h 30m A.M., and doubtless overcast for the rest of the night. Some suspicions of A.B. about midnight.

Aug. 10th.—About 2^h A.M. and 3^h A.M. of the 11th, were patches of auroral light, low on horizon, W. of N.

Sept. 1st.—An extensive display, from twilight to 10^h 30m at least. Streamers through a large amplitude, reaching up to zenith, and perhaps farther.

Sept. 2d.—Seen at Bermuda, where it was conspicuous.

1853.

Sept.	22	Ov't.	Obs. nearly or quite impos. to 9 ^h .
	23	Clear.	No A.B. to 9 ^h .
	24	Clear.	No A.B. seen to 8½ ^h .
	25	Clear.	No A.B. to 9 ^h .
	26	Ov't.	
	27		
	28	Ov't.	Obs. impos. to 9 ^h at least.
	29	Clear.	No A.B. to 8 ^h .
	30	Mostly clear.	No A.B. to 8½ ^h .
Oct.	1	Mostly ov't.	No sufficient observation.
	2	Clear.	No A.B. at 9¼ ^h .
	3	Clear.	No A.B. to 9 ^h .
	4	Clear.	No A.B. at 8¼ ^h .
	5	Ov't.	Obs. impos. to 9 ^h at least.
	6	Clear.	No A.B. to 8¾ ^h .
	7	Clear.	No A.B. to 9 ^h . Moon begins to interfere.
	8	Clear.	Moon. No A.B. seen to 9 ^h .
	9	Ov't.	Obs. impos. at 8 ^h , and probably most of night.
	10	Clear.	Moon. No A.B. seen to 9.
	11	Partly clear.	Moon. No A.B. seen to 9 ^h .
	12	Clear.	Moon. No A.B. at 8 ^h .
	13	Ov't, or chiefly so,	to 8 ^h .
	14	Clear.	Moon. No A.B. seen to 9 ^h .
	15	Clear.	Moon. No A.B. seen to 9 ^h .
	16	Clear.	Moon. No A.B. seen to 9 ^h .
	17	Clear.	Moon. No A.B. at 8¾ ^h .
	18	Clear.	Moon most of evening. No A.B. seen to 10 ^h .
	19	Clear.	Moon. No A.B. seen to 9 ^h .
	20	Somewhat cloudy.	No A.B. certain, although som't susp. ab't 9 ^h .
	21	Ov't.	Obs. impos. to 9 ^h , and probably all night.
	22	Mostly ov't.	Obs. nearly impos. to 9 ^h .
	23	Partly clear.	No A.B. to 8 ^h .
	24	Ov't to 9 ^h ;	clearing up between 9 ^h to 10 ^h . Obs. impos.
	25	Mostly clear.	No A.B. to 9 ^h at least.
	26	Partly clear.	No good obs.
	27	Ov't.	Obs. impos. to 10 ^h , and doubtless all night.
	28	Ov't.	Obs. impos. to 9 ^h .
	29	Ov't.	
	30	Ov't about 8 ^h .	
	31	Clear.	No A.B. at 8 ^h .
Nov.	1	Clear.	Slight A.B.*
	2	Clear.	No A.B. to 8 ^h .
	3	Ov't to 9 ^h	at least.
	4	Clear.	No A.B. to 9 ^h .
	5	Ov't. (?)	
	6	Clear.	Moon. No A.B. to 9 ^h .
	7	Clear.	Moon. No A.B. to 9 ^h .
	8	Ov't and rainy.	Obs. impos. to 9½ ^h , and doubtless all night.
	9	Clear.	Moon. No A.B. seen to 9 ^h .
	10	Clear.	Moon. No A.B. seen to 9 ^h .
	11	Ov't.	Obs. impos. to 9 ^h , and probably all night.
	12	Ov't.	Obs. impos. to 9 ^h , and doubtless all night.
	13	Ov't.	Obs. impos. to 9 ^h , and probably most of the night.

(466)

 Nov. 1st.—Patches of light low in N.E. and N. during the evening. No streamers seen.

1853.

- Nov. 14 Clear. Moon. No A.B. seen at 8 $\frac{3}{4}$ h.
 15 Mostly ov't. Moon. Obs. impos.
 16 Ov't. Obs. impos. to 9 $\frac{1}{2}$ h, and doubtless all night.
 17 Mostly ov't. Obs. impos., probably all night.
 18 Ov't. Obs. impos. to 10h, and doubtless all night.
 19 Mostly clear. Moon. No A.B. seen to 9h. [obs.
 20 Ov't early; aft. clear overhead. No A.B. seen to 9h, but no certain
 21 Ov't. Obs. impos. to 9h, and doubtless all night.
 22 Ov't. Obs. impos. to 9h, and doubtless all night.
 23 Ov't. Obs. impos. to 9h, and probably all night.
 24 Mostly clear. No A.B. to 10h.
 25 Clear. No A.B. to 9h.
 26 Clear. No A.B. to 8 $\frac{1}{2}$ h.
 27 Ov't. Obs. impos. to 9h, and probably all night.
 28 Ov't. Obs. impos. to 9h, and probably all night.
 29 Ov't. Obs. impos. to 8h, and probably all night.
 30 Clear. No A.B. seen to 9 $\frac{1}{2}$ h.
 Dec. 1 Ov't. Obs. impos.
 2 Ov't. Obs. impos.
 3 Partly clear. No A.B. at 8h.
 4 Clear. No A.B. to 9h.
 5 Ov't to 9h; doubtless all night; ov't before dawn of 6th.
 6 Showery ab't 7h, aft. cl'r: moon: no A.B. at 9h 50m: no A.B. at 4 $\frac{1}{8}$ h
 7 Clear. Moon. No A.B. at 9h. [to 4 $\frac{1}{2}$ h A.M. of 7th.
 8 Clear. Moon. No A.B. seen at 9h.
 9 Clear. Moon. No A.B. seen.
 10 Clear. Moon. No A.B. seen at 9h.
 11 Clear. Moon. No A.B. seen at 9h.
 12 Ov't. Obs. impos. to 9h, and probably all night.
 13 Mostly clear. Moon.
 14 Clear, or chiefly so. Moon. No A.B. seen to 9h.
 15 Clear. Moon. No A.B. seen to 9h.
 16
 17 Ov't.
 18 Clear. No A.B. to 8h.
 19 Clear early in evening. No A.B. Ov't in N. about 7h.
 20 P'y cl'r. No A.B. seen to 10h, but obs. much embarrassed by cl'ds.
 21 Partly clear. No A.B. seen to 9h.
 22 Partly clear. No A.B. seen to 9h.
 23 Ov't. Obs. impos. to 9h, and probably all night.
 24 Clear. Susp. auroral light, low on hor., once or twice during ev'g.
 25 Clear. No A.B. to 9h.
 26 Clear. No A.B. to 9h.
 27 Clear.
 28 Ov't. Snowing most of the night, and till noon of 29th.
 29
 30 Ov't and snowing. Obs. impos. to 9h, and probably all night.
 31

1854.

- Jan. 1 Clear. No A.B. to 9h.
 2 Clear. A.B. all the evening. (467)
 3 P'y cl'ded and hazy. No A.B. seen to 9h, but obs. nec'y imperf.
 4 Clear. No A.B. at 9h.
 5 Ov't. Obs. impos. to 9h, and probably all night.
 6 Mostly ov't. Obs. impos. to 9h. Cleared off during night.

1854.

- Jan. 7 Clear until about 8^h, after which ov't. Moon. No A.B. seen.
 8 Clear early in ev'g. Moon. No A.B. seen. After about 8^h ov't.
 9 Partly clear. No A.B. seen.
 10 Partly clear. No A.B. seen.
 11 Ov't. Obs. impos. to 9^h, and doubtless all night.
 12 Ov't. Obs. impos. to 9^h, and doubtless all night.
 13 Ov't. Obs. impos. to 9^h at least.
 14 Mostly ov't. Moon. No A.B. seen. Obs. nearly impos.
 15 Ov't. Obs. impos. to 9^h, and probably all night.
 16 Ov't. Obs. impos. to 9^h, and doubtless all night.
 17 Mostly ov't. Obs. nearly impos.
 18 Ov't. Obs. impos. to 9^h, and later.
 19 Ov't. Obs. impos. to 9^h, and probably all night.
 20 Ov't. Obs. impos. to 9^h, and probably all night.
 21 Clear. No A.B. to 9^h.
 22 Clear. No A.B. to 9^h.
 23 Clear. Most of the evening saw no A.B.* (468)
 24 Clear. No A.B.
 25 Clear. No A.B.
 26 Ov't. Obs. impos. to 9^h, and doubtless all night.
 27 Ov't. Obs. impos. to 9^h, and doubtless all night.
 28 Clear. A.B. from dusk to 9^h at least.* (469)
 29 Clear. No A.B. seen to 9^h. Obs. suspended from 6½^h to 9^h.
 30 Ov't. Obs. impos. to 9^h, and probably all night.
 31 Mostly clear. No A.B. seen to 9^h.
 Feb. 1 Mostly clear. Moon. No A.B. seen to 9^h.
 2 Mostly clear. Moon. No A.B. seen to 9^h.
 3 Mostly clear. Moon. No A.B. seen to 9^h.
 4 Clear. Moon. No A.B. seen to 9^h.
 5 Ov't and snowing. Obs. impos. to 9^h, and probably all night.
 6 Clear. Moon. No A.B. seen to 10^h.
 7 Ov't. Obs. impos. to 9^h, and doubtless all night.
 8 Ov't and raining. Obs. impos. to 10^h, and doubtless all night.
 9 Clear. Moon. No A.B. seen to 9^h.
 10 Clear. Moon. No A.B. seen to 9^h.
 11 Mostly clear. Moon. No A.B. seen to 9^h.
 12 Ov't. Obs. impos. to 9½^h, and doubtless all night.
 13 Ov't. Obs. impos. to 9^h, and probably all night.
 14 Ov't. Obs. impos. to 10^h, and probably all night.
 15 Ov't. Obs. impos. to 10^h, and probably all night.
 16 Nearly clear. No A.B. seen to 9^h.
 17 Clear. No A.B. to 9^h.
 18 Clear. No A.B. to 8½^h.
 19 Clear. No A.B. to 7½^h.
 20 Ov't: obs. impos. to 9^h, and d's all n't: driving snow-storm all n't.
 21 Very clear. No A.B. to 9^h.
 22 Ov't. Obs. impos. to 10½^h, and probably all night.
 * * * * * * * *
 25 Mostly clear. No A.B. to 8^h.
 26 Ov't. Obs. impos. to 9^h, and doubtless all night.

Jan. 23d.—About 8h 30m saw on N. horizon a bright light of more than 30° amplitude, but not extending upward more than 2° or 3°. Probably A.B.

Jan. 28th.—Amplitude 90°, 100°, or more; elevation small, 3° to 5°; light strong. I saw no well defined streamers.

1854.

Feb.	27	Clear.	No A.B. to 9 ^h .*	(469)
	28	Ov't.	Obs. impos. to 9 ^h . Nearly clear towards dawn of Mar. 1st.	
Mar.	1	Clear.	Moon interferes. No A.B. seen to 9 ^h .	
	2	Ov't.	Obs. impos. to 9 ^h , and doubtless all night.	
	3	Ov't.	Obs. impos. to 9 ^h , and probably all night.	
	4	Mostly clear.	(?) No A.B.	
	5	Clear.	Moon. No A.B. to 8 ¹ / ₂ ^h .	
	6	Clear.	Moon. No A.B. to 9 ^h .	
	7	Ov't.	Obs. impos. to 9 ^h , and doubtless all night.	[A.B.]
	8	Ov't	early in ev'g; thunder shower about 7 ^h ; at 9 ^h cl'r: moon: no	
	9	Ov't.	Obs. impos. to 9 ¹ / ₂ ^h , and doubtless all night.	
	10	Ov't.		
	11	Clear.	Moon. No A.B. seen to 9 ^h .	
	12	Clear.	Moon. No A.B. seen to 9 ^h .	
	13	Nearly cl'r	early in ev'g: moon: no A.B. seen: at 8 ^h and after ov't.	
	14	Mostly ov't.	Moon. Obs. impos. to 9 ^h .	
		*	* * * * *	
	17	Ov't.		
	18	Clear.	No A.B. to 9 ^h . (Nor at 10 ^h . [F. B.])	
	19	Clear.	No A.B. to 9 ^h .	
	20	Clear.	No A.B. to 9 ^h . (Nor at 12 ¹ / ₂ ^h . [F. B.])	
	21	Clear.	Faint auroral light during the evening.*	(470)
	22	Ov't.	Obs. impos. to 9 ^h , and doubtless all night.	
	23	Ov't.	Now and then a few stars to be seen. (F. B.)	
	24	Clear.	No A.B. to 9 ^h .	
	25	Clear.	No A.B. to 9 ^h . (An A.B. (?) [F. B.])	
	26	Ov't:	obs. impos. to 9 ^h , p. all n't. (Cl'r: no A.B. seen at 10 ^h . [F.B.])	
	27	Clear.	Aurora Borealis.	(471)
	28	Clear.	Aurora Borealis.	(472)
	29	Clear.	Aurora Borealis.	(473)
	30	Ov't.	Obs. impos. to 9 ^h , and doubtless all night.	
	31	Ov't.	Obs. impos. to 9 ^h , and doubtless all night.	
Apr.	1	Ov't.	Obs. impos.	
	2	Clear.	Moon. No A.B. seen to 9 ^h .	
	3	Clear.	Moon. No A.B. seen at 9 ^h .	
	4	Clear, mostly.	Moon.	
	5	Mostly ov't.		
	6	Mostly ov't.		
	7	Mostly ov't.	Obs. impos. to 9 ^h at least.	
	8	Hazy.	Moon. No good obs.	
	9	Ov't.	Obs. impos. to 9 ^h , and doubtless all night.	
	10	Mostly ov't.	Obs. impos. to 9 ^h .	
	11	Clear.	Moon. No A.B. seen to 9 ¹ / ₂ ^h .	
		*	* * * * *	
	20	Clear.	No A.B. to 9 ^h .	
	21	Clear.	A.B. seen from 8 ^h onward.*	(474)
	22	Ov't.	Obs. impos. to 9 ^h , and doubtless all night.	
	23	Clear.	A.B. from end of twilight.*	(475)

Feb. 27th.—A.B., seen about 10^h by Mr. Lyman Baird, chiefly a low arch, of about 45° amplitude.

March 21st.—Apparently none at 9^h.

April 21st.—Amplitude 100° or more, upward extent 10° or 15°, without many definite streamers while I watched.

April 23d.—Amplitude 96° or more, light pretty bright, extending up 25° or 30°, with faint streamers. Did not observe after 8^h 45m.

1854.

Apr.	24	Mostly ov't. Obs. impos. to 9 ^h .							
	25	Clear. No A.B. to 9 ^h .							
	26	Ov't. Obs. impos. to 9 ^h , and probably most of the night.							
	27	Ov't. Obs. impos. to 9 ^h , and probably all night.							
	28	Ov't. Obs. impos. to 9 ^h , and probably all night.							
	29	Ov't. Obs. impos. to 9 ^h , and doubtless all night.							
	30	Ov't. Obs. impos. to 9 ^h , and doubtless all night.							
May	1	Clear. Moon. No A.B. seen to 9 ^h . Obs. imperfect.							
	2	Ov't. Obs. impos. to 10 ^h , and doubtless all night.							
	3	Ov't. Obs. impos. to 8 ^h , and doubtless all night.							
	4	Ov't. Obs. impos. to 9 ^h , and doubtless all night.							
	5	Clear to about 9 ^h . Moon. No A.B. At 9 ^h thinly ov't.							
	6	Clear. Moon. No obs.							
	7	Clear. Moon. No A.B. seen at 8 ³ / ₄ ^h .							
	8	Clear. No A.B. (F. B.)							
	9	Mostly ov't. Obs. impos.							
	10	Ov't. Obs. impos.							
	11	Ov't. Obs. impos. to 9 ^h .							
	12	Partly clear. Moon. No obs.							
	13	Ov't. Obs. impos. to 9 ^h , and probably all night.							
	14	Ov't. Obs. impos. to 9 ^h , and doubtless all night.							
	15	Clear. Faint auroral light about 9 ^h .							(476)
	16	Clear.*							(477)
	17	Ov't. Obs. impos. to 9 ^h , and doubtless all night.							
	18	Ov't. Obs. impos. to 8 ¹ / ₂ ^h , and doubtless all night.							
	19	Clear. No A.B. to 10 ^h .							
		* * * * *							
	23	Clear.							
	24	Clear.							
	25	Ov't.							
	26	Ov't.							
		* * * * *							
June	3	Clear. Moon. No A.B. seen to 10 ^h .							
	4	Clear. Moon. No A.B. seen to 9 ¹ / ₂ ^h .							
	5	Cloudless, but hazy. Moon. No A.B. seen to 9 ^h .							
	6	Nearly clear. Moon. No A.B. seen to 9 ^h .							
	7	Ov't. Obs. impos. to 9 ^h , and doubtless all night.							
		* * * * *							
	11	Mostly ov't to 9 ^h at least.							
	12	Ov't to 9 ^h at least.							
		* * * * *							
	15	Ov't. Obs. impos. to 9 ^h , and probably all night.							
	16	Cloudless, but very hazy. Obs. impos. to 9 ^h , and d's all night.							
		* * * * *							
	22	Ov't.							
	23	Ov't.							
	24	Clear.							
	25	Clear. (No A.B. at 9 ¹ / ₂ ^h . [F. B.])							
	26	Mostly clear to 9 ¹ / ₂ ^h , and no A.B. At 10 ^h nearly ov't.							

May 16th.—Suspected some unusual illumination in the N. about 9^h; probably slight A.B.

EXTRACTS FROM AN AURORAL REGISTER KEPT AT NEW HAVEN, CONN.,
BY MR. FRANCIS BRADLEY.

Mr. Francis Bradley, now of Chicago, Ill., kept an Auroral Register in New Haven, beginning in June, 1842, and extending to June, 1854. From this Register Mr. Herrick made frequent extracts, marking them with the initial letters F. B.; and these extracts are given in the preceding pages. But not finding them later than 1850, the Committee of Publication had inferred that Mr. Bradley's observations did not extend beyond that time. After all of Mr. Herrick's Register, except the last two pages, had been printed, they were gratified to learn that Mr. Bradley continued to observe as long as Mr. Herrick, and that thus essential additions could be made to his record, and especially that the gaps in it could be filled.

The two Registers have been compared throughout, and every entry of Mr. Bradley's that furnishes additional information likely to be of value, is given below. It has not been thought necessary, however, to give the observations for those nights when both Mr. Herrick and Mr. Bradley state that no aurora was seen, even though the latter observed to a later hour of the evening. This method of selection brings out an undue proportion of apparent discrepancies between the two observers. Most of these are evidently due to their reporting the state of the sky as it appeared at different moments.

During part of the time covered by his observations, Mr. Bradley had charge of the Observatory in Yale College, and gave instruction in Practical Astronomy. His careful accuracy in astronomical observations justifies special confidence in his records of the aurora.

In the following pages, auroras reported by Mr. Bradley are numbered, when they have not been numbered in Herrick's Register.

1842.	
May 28	Tolerably clear this evening, some clouds in the south; supposed faint aurora at 9 ^h ; no streamers; very doubtful.
July 4	Partially clear. About 11 ^h stars shone brightly.
Oct. 30	Tolerably clear. No A.B. at 8 ¹ / ₂ ^h .
Nov. 2	Clear; hazy near horizon. No A.B. Thought I saw a faint light along the north, but could not be satisfied that it was A.B.
11	Very clear. Moon. Faint suspicions of an A.B. at 8 ^h ; was not satisfied that there was one.
21	At 6 ^h considerably cloudy. At 8 ¹ / ₄ ^h clear, fine A.B. Moon began to interfere. At 11 ^h should think it not all gone. (478)
Dec. 1	Clear, here and there a cloud: susp. a faint A.B. at 12 ^h , but not cert.
1843.	
Jan. 23	Clear at 6 ¹ / ₂ ^h . No A.B. Cloudy at 8 ^h , 9 ^h , and 10 ^h , and p. all night.
Mar. 28	Cloudy; fair at 9 ¹ / ₄ ^h . No A.B. Seemed rather lighter than usual in the N. at 10 ¹ / ₂ ^h , but do not think there was any A.B.

1843.

- Apr. 2 Clear. No A.B. Saw a well defined strip of light about 40° long, resembling the comet so much that I took it for one at first sight; but it moved pretty fast sideways. It was below the pole about 4° or 5° when first seen (at $7\frac{1}{4}^h$); moved upward and eastward until it pointed 5° east or south of Arcturus, when it was faint and just distinguishable—a curious sight: I called it an auroral streak; extent about 20° east and west of Pole star (40° long); could discover no other traces of an aurora. There were none at 9^h . Its light was a little stronger than that of the comet on the 11th or 17th, but resembling it very much—decidedly divergent from one end; greatest width not over 1° till nearly extinct when it appeared perhaps $1\frac{1}{4}^\circ$ or $1\frac{1}{2}^\circ$, losing its end first and becoming pretty uniformly wide.
- Apr. 5 Clouds on the northern and western horizon. An aurora about $7\frac{1}{2}^h$; uncertain when it disappeared: no streamers. (Should probably be Apr. 6th.)
- May 23 Heavy cloud on western and northern horizon, above it apparently brighter than an ordinary sky; saw no streamers at 9^h . Rain from $9\frac{1}{2}^h$ to $10\frac{1}{4}^h$. Cloudy at $10\frac{1}{2}^h$. (479)
- June 5 Cl'y in N. at 9^h ; tolerably clear in S. hemisphere. Moon.
29 Cloudy. Tolerably clear at $11\frac{1}{2}^h$. No A.B.
- Aug. 23 Not very clear in north at 8^h or 9^h ; saw no A.B.
29 Clear at 10^h . No A.B.
- Sept. 4 Somewhat cloudy in north. No A.B. at 10^h .
18 Cloudy. Clear spaces in the north at about 11^h ; apparently an A.B. No streamers seen. (480)
20 No A.B. Rather hazy at 10^h .
- Oct. 4 Mostly cloudy: clear spaces of sky in N.: no A.B. at 11^h : moon.
14 Clear. First saw an auroral bow in the N. at $6\frac{1}{2}^h$, not very well defined, rather faint, about 5° or 6° at highest part; no streamers. Noticed it until 7^h . Looked again at $10\frac{3}{4}^h$,—then a general brightness, perhaps 12° or 14° high, the brightest part E. of N. Moon rose about $9\frac{1}{4}^h$ and very much interfered. The light in the north was of a red color.
- Nov. 24 Cloudy to $11\frac{1}{2}^h$; very clear on morning of 25th at $5\frac{1}{4}^h$; strongly suspect an A.B.—probably Milky Way.
27 Clear. Was uncertain whether there was an A.B. east of north near horizon at $8\frac{3}{4}^h$, or not; seemed to be lighter there than in neighboring portions of the heavens. Moon near quarter.
- Dec. 8 Here and there a clear space, but at 11^h ov't, and prob. all night.
24 Ov't to 11^h . Clear next morning at 4^h . No A.B.

1844.

- Jan. 1 Clear. Moon. No A.B. to 12^h .
8 Clear. Think there was no A.B.
14 Clear to 11^h . There may have been a slight A.B. at 11^h ; did not look critically.
- Feb. 17 Alternately clear and cloudy. No A.B. at 11^h .
- Mar. 6 Cloudy to $9\frac{1}{2}^h$, when it began to be clear. Clear at $11\frac{1}{4}^h$, except low cloud in N. Somewhat cloudy at $12\frac{1}{4}^h$. Moon.
- Apr. 17 Cloudy to 10^h , and doubtless later; two or three clear streaks in the north looked rather bright, but think there was no A.B.
- May 8 Cl'y to about $9\frac{1}{2}^h$; cl'r in N. at $10\frac{1}{4}^h$: very bright, but think no A.B.
17 Ov't to $8\frac{3}{4}^h$; between that and 11^h cleared off. No A.B. at 11^h . Cloudy and rainy next morning.

1844.

- June 10 Too cloudy to allow good obs. at 8^h; looked out at 10^h, too cloudy; again at 11^¼^h; quite light in N. under large cloud, but think there was no A.B.
- July 2 Clear. No A.B. to 9^h.
- 6 Clear to 10^h. Cloud in N. and W. with lightning. No A.B. Cl'y about 10^¾^h, and rain. Clear at 11^½^h. No A.B.
- 16 Ov't early in evening. At 8^½^h very fair. Clear at 10^½^h to 11^h, and probably later. No A.B. Looked rather light in N.E. between clouds; doubtful about there being any A.B. at 9^¾^h.
- 17 Clear early in ev'g; at 10^h clouded in N.; at 11^½^h clear. No A.B.
- Aug. 9 No A.B. Watching for meteors from 9^½^h to 3^h A.M. Clouds concealed three-eighths of them; five persons saw 367 meteors. Ov't after 5^h 5^m.
- 26 Somewhat cloudy early in evening; at 9^h fair. Moon. No A.B.
- 31 Hazy in early part of evening. No A.B. to 9^h.
- Sept. 1 Scattering clouds in N. to 8^½^h. No A.B.
- 21 Clear. No A.B. at 10^h.
- Oct. 5 Clear. No A.B. to 10^h. Susp. an A.B. at 10^½^h, but very doubtful; saw no streamers.
- 11 Clear. No A.B. to 10^¼^h. Rather light in N. about 11^h.
- 22 Clear. About 9^½^h suspected an A.B.; saw no streamers. Moon shining most brilliantly.
- Dec. 25 Clouds fill the sky, with here and there clear spaces. Moon. No A.B. at 9^h. None at 10^h.

1845.

- Jan. 5 Thin clouds: at 9^h clear streak on N. hor. about 4° wide. No A.B.
- Feb. 2 Clear: rather light in N. at 8^¾^h: hardly think there was any A.B.
- 26 Cloudy to 7^h, with a slight sprinkle of rain. Clear from 8^h to 11^h. Suspicion of A.B.; saw no streamers in a few minutes watch.
- 27 Ov't to 8^h, and perhaps later. Clear at 10^h, but hazy in N. Clear at 12^h. No A.B.
- Apr. 5 Ov't to 10^h, with slight snow storm. Clear streak in N. at 11^h and perhaps before, about 8° or 9° from horizon; heavy cloud over it.
- May 17 Ov't: began to cl'r ab't 8^h; cl'r at 9^½^h: moon: no A.B.: ov't at 10^h.
- June 4 Hazy, with a few clouds; north considerably obstructed by clouds at times: tolerably good obs. No A.B. to 10^½^h.
- 9 Cl'y from hor. up 20°; very thick, dusty atmosphere: ov't a little after 9^h; tolerably clear at 10^h. No A.B.
- 17 Clear to 12^h. Moon. Suspected a slight A.B. about 11^½^h; saw no streamers, no arch, but diffuse light.
- 24 Ov't to 10^h. At 11^h north nearly clear. No A.B.
- 30 Thick cloud on the N. hor. about 10° high; otherwise clear. No A.B., though it was very light just above the cloud, and behind it (prob. daylight), at 9^¼^h to 9^½^h. At 9^½^h scarce any of this light.
- July 14 Ov't to 9^½^h; quite hazy at 10^h.
- 20 Clear at Ridgefield, Conn. No A.B. to 9^h. Moon.
- 25 Quite hazy; some clouds. No A.B. at 9^h to 9^¼^h.
- 28 North obstructed to 9^½^h; after that clear, and a faint auroral arch was visible, not defined below, but pretty well defined above. No streamers. Extent 60° or 70° on horizon; did not much resemble an auroral arch as they usually appear.
- 31 Clear to 9^h. No A.B. After 9^h cloudy to 10^h, and probably later. (It is probable that Mr. Herrick's reference to Mr. Bradley [see p. 74] at this date is an error. This date ought not therefore to have been numbered in Herrick's Register.)

1845.

- Aug. 22 Some clouds obstruct north. No A.B. at 8^h; none at 9^h.
 29 North almost entirely filled with clouds to 9^h. Looked rather bright among clouds at 9^h. Scarcely think there was any A.B.
- Sept. 7 Very clear. Moon. Suspected a slight A.B. at 9^h, but concluded that there was none.
 28 Mostly clear. At 7^h N. very much obstructed; no signs of an A.B. At 9^h somewhat obst.; some signs of an A.B., though scarcely think there was any. Clear at 9½^h.
 29 Clear. No A.B. to 10^h. Looked rather light in N. at 10^h, but believe there was no A.B.
- Nov. 12 Very clear: no A.B. to 7^h: moon: p'y cl'r 3¾^h to 5^h A.M.: no A.B.
 15 Not entirely cl'r to 6½^h; at 7½^h very cl'r. No A.B. at 10½^h. Looked rather light in N.; bright moon, and favorable place for obs. Scarcely think that there was an A.B.
 26 Hazy. No A.B. to 10^h. A person informs me that about 6½^h or 7^h he noticed what he thought was an A.B. Soon clouded over; saw no streamers.
- Dec. 1 Ov't to 10^h, except cl'r 15^m ab't 6½^h and a short time bet'n 7^h and 8^h.
 18 Partially clear for a short about 6^h to 6½^h. Ov't to 10^h.
 29 Clear. No A.B. to 8½^h. Saw Biela's comet this evening about 37' less A.R. than Kappa Piscium, about the same + dec. It was a nebulous looking object with pretty bright nucleus, with three bright points like small stars, but seen only by indirect vision occasionally. Tail 3' or 4' diameter (or length)—very difficult to determine about the direction of it. It appeared turned toward the sun. A small nebulous spot preceded it about two or three minutes in arc.

1846.

- Jan. 2 Mostly ov't to 10^h. About 11^h a narrow clear streak W. of N. which was very bright. Some suspicion of A.B.
- Feb. 6 Thin filmy clouds covered the sky. No A.B. to 10^h.
 10 Ov't to 10^h, except a short interval of broken clouds about 7^h.
- Mar. 15 N. much obst. at 8¼^h, tolerably cl'r at 9^h; some suspicions of A.B.; but conclude there is none. None at 10^h.
 17 Clear to 8½^h; cloud in N. at 9^h. At 10^h clear; had suspicions of A.B. about 9½^h to 10^h, but am inclined to think there was none.
 18 Clear. No A.B. to 10^h, though it appeared much like 17th.
 19 Clear; rather more like an A.B. than the two preceding ev'gs, but very doubtful about any A.B.
 29 Considerably hazy at 8½^h, clear at 10^h, no A.B.
- Apr. 20 Mostly clear, yet inclining to cloudiness. Part of the N. sometimes obscured: no A.B. to 9½^h; in the observatory to that time.
- May 25 Ov't. At 11^h tolerably clear in the N.; obs. imperfect.
- July 29 Mostly ov't. At 9½^h N. considerably clear, no A.B. to 9¾^h.
- Aug. 24 An A.B. sprung up about 8^h or 8¼^h—streamers rather numerous—no well defined arch—mixed with so much cloud near horizon as to destroy the symmetry of the arch. About 8¾^h it gathered into patches of light, with here and there a faint streamer. Most of the light was E. of N. point. Two or three bright streamers E. of N. were observed to move E.: none others were certainly seen to move.
 29 Almost wholly ov't at Ridgefield, Conn. At 10^h some clear space in the N., and under a cloud about 5° or 6° high, thought there was an A.B.—thought I saw a streamer or two, but it might have been the contrast of cloud and sky. It soon clouded. (481)

1846.

- Aug. 30 Clear at Ridgfield; very strongly suspected an A.B., but saw no streamers: noticed it at intervals from 9^h to 10^h.
- Sept. 14 Clear; slightly suspected some auroral light about 9^h or 9½^h.
- 21 Clear. First noticed ab't 8½^h an A.B.; a band-shaped mass of light. I did not watch for streamers. About 10^h it had increased in brightness and extent. Not a very regularly shaped arch, but a mass of light extending perhaps 65° or 70°, and quite red, particularly that portion W. of N. There were numerous red streamers, some of them extending up 40°.
- 22 Clear. First noticed a bank of auroral light about 8¾^h; watched it at intervals up to 10¼^h, but saw no streamers certainly. It changed very little during the whole time.
- 23 Clear. Noticed about 8^h, an arch-shaped bank of auroral light, not over 2° or 3° high. At 10^h it had increased in brightness, extent, and elevation. Amplitude about 60° or 65°, and 5° or 6° high; pretty well formed. Saw no streamers certainly, but thought I observed one occasionally extending upward 4° or 5° from the arch.
- Oct. 14 Partly clear at 7^h. Ov't at 8¾^h and 9^h. At 11^h clear, suspected an A.B., not a very good obs.

1847.

- Jan. 1 Partly cl'r at 8^h, but a cloud on the earth. Moon. No A.B. to 9^h.
- 7 Ov't to 11^h and probably later: at 12^h clear N. and W. Thought there was an A.B. (482)
- Feb. 7 Quite hazy. No A.B. at 8^h; yet it was quite light among the openings or thinner haze. At 10^h ov't.
- Mar. 19 Clear. Saw about 9¼^h, a bright A.B. with streamers. It increased in magnitude and splendor, and nearly equaled those of 1837-39.
- Apr. 5 Cl'r, m'y: no A.B. to 10^h: very slightly susp. faint aur. light ab't 9^h.
- 7 Clear. About 8^h first noticed, while in the observatory, an auroral arch with innumerable streamers. It increased in splendor and magnitude till 11^h. At 9½^h first noticed an arch of light spanning the heavens from E. to W. and passing S. of the zenith. About 10^h, Pollux was in the middle of the band, which was moving South. During all the time innumerable streamers, tinted green and purple, were marching and countermarching, performing evolutions indescribable. At 10½^h sheets of light swept upward.
- 22 N. slightly obst. to 9^h, at 10^h wholly ov't. Moon. Saw no A.B.
- 30 Entirely ov't at 9^h: now and then a little clear sky. At 9½^h quite a light streak in N. low down; probably owing to moon and contrast of light and dense clouds.
- May 7 Ov't except here and there a few stars to be seen. Thought it quite light in the N.E. through the openings in the clouds; presume it was the contrast.
- 10 Mostly clear, some clouds on horizon; hazy, yet stars tolerably conspicuous. No A.B. to 10^h, yet a light in the N. attracted attention; think there was no A.B.
- June 14 Ov't, and a shower about 8½^h; nearly clear at 9½^h and no A.B.: clouds interfered very much. Appeared quite light through some of the openings before and after 10^h.
- 21 Entirely ov't 9^h to 10^h; clear from 7½^h to about 9^h and no A.B.
- July 10 Thick clouds; entirely ov't to 10^h.
- Aug. 4 Clear. First noticed an A.B. about 9^h. At 9¾^h a fine arch about 4° high, ampl. about 60°; very soon a second one formed, 7° high

1847.

- and ampl. 90° more or less; but cut off at Eastern end. Both arches rose upward gradually, soon after which the upper one broke up into patches of light, which continued to move southward: quite ill-defined. The first arch continued tolerably perfect to $10\frac{1}{2}^h$, when I ceased looking at it from the observatory.
- Sept. 16 Clear. A.B. I first saw streamers 7° to 10° high about $8\frac{1}{4}^h$, without much other light, though the moon was shining. The moon set about 10^h , after which and even before, there was a segment of an arch 4° or 5° alt. and 60° to 70° ampl. About the time the moon set, the arch had become mere patches of light. Some few streamers then.
- Oct. 1 Cl'r: no A.B. to $10\frac{1}{4}^h$; there was a slightly suspicious light in the N.
- Nov. 14 Slightly suspected an auroral light, between $7\frac{3}{4}^h$ to 8^h , but too cloudy and too much moonlight to determine with any certainty.
- 15 Much clouded to 10^h . Clear in the N. at $10\frac{1}{2}^h$ and to 11^h . Slightly suspected an A.B. at 11^h . It may have been occasioned by the moon which was in quadrature.
- 19 Slightly suspected an A.B. through an opening in the clouds about 8^h . Entirely ov't in a few minutes: moon.
- 30 Cl'r to ab't $9\frac{1}{2}^h$; think there was no A.B. yet a faint auroral light slightly suspected at times. Ov't at $9\frac{3}{4}^h$.
- Dec. 8 Clear to 7^h ; ov't to 10^h . Mostly cl'r at 11^h . Was there an A.B.?
- 26 Clear. Slightly suspected auroral light at 8^h .
- 1848.
- Jan. 4 Clear. Slightly suspected a faint auroral light, but am inclined to think that there was none.
- 5 Ov't to 10^h . Clear at 12^h ; saw no A.B.: poor obs.
- 7 Ov't early: at $11\frac{1}{2}^h$ cl'r, and perhaps earlier; saw no A.B.: poor obs.
- 23 Cl'r. Strongly susp. an aur. light ab't 8^h ; saw no streamers: moon.
- 29 Clear. No A.B. at 7^h to $7\frac{1}{2}^h$: none at 9^h . Suspected A.B. at $11\frac{1}{2}^h$; not a very good obs.
- Feb. 6 Ov't to 9^h and doubtless later, snowing at $8\frac{1}{2}^h$. Mr. Pardee saw an A.B. through an opening in the clouds about 6 A.M. of the 7th. It was of a red color. (483)
- 16 Clear. Moon. About 9^h to $9\frac{1}{4}^h$ suspected some auroral light, but was uncertain.
- 25 Cl'r. Strongly susp. some aur. light ab't $—^h$, but at $10\frac{1}{4}^h$ concluded there was none.
- Mar. 22 Nearly clear at $9\frac{3}{4}^h$. No A.B. seen; some clouds in the way.
- Apr. 28 Almost wholly ov't to 9^h , partially clear at times. N. obs. at 10^h .
- 30 Clear. Strong suspicions of a sl't A.B. ab't 9^h : saw no streamers.
- May 27 Clear. About $9\frac{1}{2}^h$ suspected a slight A.B., but a few minutes watching confirmed it, as I saw one streamer distinctly, and two or three others faintly: the one reached up to about 7° or 8° alt. E. of N. At $11\frac{3}{4}^h$ ov't.
- 28 Almost wh'y ov't to 10^h . Through an opening in the clouds ab't $9\frac{1}{2}^h$ slightly suspected some A.B., but was uncertain.
- July 28 Almost wh'y ov't from 9^h to $9\frac{1}{2}^h$. Clear at $10\frac{1}{2}^h$; could see no A.B.
- Aug. 17 Sky much obs. by clouds. No A.B. seen from the observatory.
- 21 Ov't entirely to 9^h . At $9\frac{3}{4}^h$ saw the light of an A.B. above the trees; could not be mistaken: saw no streamers.
- 23 Clear, and no A.B. at 12^h .
- 27 Clear. A.B. slightly suspected about 9^h , but think there was none.
- Sept. 8 Clear. No A.B. seen at $8\frac{1}{2}^h$, nor at 10^h . Not a very good obs.
- Oct. 21 Ov't early. M'y cl'r at $9\frac{1}{2}^h$, but hazy in N. Saw no A.B.: poor obs.

1848.

- Oct. 23 An arch of 70° amplitude, and 5° or 6° high, from 7^h to $9\frac{1}{2}^h$.
 29 Ov't to $9\frac{1}{2}^h$. Some openings in the N. about 7^h , but indicating nothing unusual.
- Nov. 8 Obs. impos. early. Clear, but moon at 10^h ; made no good obs.
 29 Clear. Saw a tall bank of auroral light about $8\frac{1}{2}^h$. At 9^h saw no traces of A.B.
- Dec. 16 Ov't to 7^h and also at $8\frac{1}{2}^h$. The New Haven Journal and Courier of the 18th says there was an aurora. (484)
 17 Nearly clear. A fine aurora from early in the evening to 11^h .
 19 Clear, saw no A.B.: not a very good obs.
 22 Ov't to $7\frac{1}{2}^h$. Cleared off about 9^h . Saw no A.B. at $10\frac{1}{2}^h$; not a very good obs.

1849.

- Jan. 14 Ov't to 9^h and prob. later. Some clear streaks in the N. about 10^h which showed I think without mistake an A.B. My obs. was not very good on account of obstructions, but I had little doubt of an aurora. (485)
- Feb. 18 M'y ov't, yet a few open spaces in the N. at 8^h which looked very light. I judged there was an A.B.: did not look after $8\frac{1}{2}^h$. (486)
 23 Clear. Slightly suspected an A.B. but was quite uncertain.
- Mar. 1 Ov't in N. at 7^h . At $8\frac{1}{2}^h$ to 9^h some clear sky on northern horizon. Appears quite suspicious, but think the light due to the moon and to contrast.
 18 An arch at 7^h and again at 9^h ; amplitude 100° , altitude 11° .
- Apr. 1 Clear. Moon. I had hardly a doubt that there was an A.B. about 9^h . Saw no streamers. (487)
 13 Nearly ov't up to 10^h ; stars dimly seen overhead; a few bright openings in N. about $9\frac{3}{4}^h$, prob. due to contrast.
 19 Clear. No A.B. to 9^h from observatory. It appeared a little suspicious, but I saw no streamers, and concluded there was no A.B.
 24 Clear. Some long low clouds in N. Bright between them but prob. due to contrast.
 25 Ov't at $7\frac{1}{2}^h$; at 10^h nearly clear; hazy and some clouds in the N. low down. No A.B. although it appeared light among the cl'ds.
- June 1 Considerable cl'r sky at times to $8\frac{1}{2}$ or 9^h . At 10^h n'y or quite ov't.
 7 Partially cloudy. No A.B. at 10^h . Moon.
 23 M'y clear. Long cloud in N. at 10^h and a little before: slight suspicion of an A.B. but probably due to twilight and contrast.
- July 8 Almost wholly ov't; a narrow clear streak obs. at 10^h in the N. quite bright: prob. due to contrast.
- Aug. 3 Clear at Ridgefield, Conn. No A.B. seen at 9^h .
 4 Clear at Ridgefield. No A.B. seen. Moon.
 6 Partially cl'r at Ridgefield: moon: no A.B. seen at 10^h ; cl'ds interf.
 10 O'vt to 10^h . (Some cl'r sky ab't 3^h or 4^h A.M. of the 11th. [A. N. S.])
 11 Partially clear at $9\frac{1}{4}^h$, but saw no A.B.
 15 Clear. No A.B. at $9\frac{1}{2}^h$: at $9\frac{3}{4}^h$ N. obstructed with broken clouds. A very slight suspicion of an A.B. about $9\frac{1}{3}^h$.
- Sept. 8 Broken clouds fill the N. at $9\frac{1}{4}^h$. The spaces revealed considerable brightness, but I considered it due to contrast.
 20 Mostly cl'r: at about $9\frac{1}{2}^h$ low cl'd in the N.: clear above; concluded that there was no A.B. though I had a very slight suspicion.
 23 Mostly clear; strongly suspected some auroral light at 10^h . Saw no streamers in a few minutes watching. Cl'ds interfered a little.
 25 Clear. Moon. No A.B. seen at $10\frac{1}{2}^h$, yet very slightly suspected.
- Oct. 22 Clear. No A.B. at $9\frac{1}{2}^h$. A slight suspicion of one about 11^h .

1850.

- Jan. 3 Partially clear. No A.B. at 11^h.
 20 Sky covered with cirri; slightly suspected an A.B.
- Mar. 3 Clear. At about 9¹/₄^h had some suspicions of an A.B. At 11^h had scarcely a doubt, but saw no streamers. (488)
 23 Ov't; began to clear off before 9^h. Moon. No A.B. seen at 9^h.
 31 Clear. Saw an auroral arch about 5° or more high, 60° or more ampl. At 11^h saw it again; no streamers.
- Apr. 6 Clear. A fine A.B. At 9^h a fine arch 10° to 12° high, 90° or less ampl.; splendid streamers. Arch broke up at 9¹/₂^h or before.
- May 7 Clear. A pretty bright A.B. No well-defined arch: streamers numerous. It increased about 11^h but I was not in a position to observe it.
 13 No A.B. at 8^h, did not observe after twilight ceased, partially cl'y, showery, but much clear sky during ev'g.
 19 Clear. Moon. Think there was no A.B. but had very slight suspicions of one about 9^h.
 27 Cl'ds prevented obs. most of the ev'g; no A.B. seen to 12^h. Moon.
- June 3 Had some suspicions of an A.B. about 10^h 20^m but clouds interfered too much to determine.
 24 Clear. No A.B. seen to 9¹/₂^h from observatory. Full moon.
- July 6 Clear, at 9¹/₂^h to 9³/₄^h; think there was a slight A.B. Saw no streamers. (489)
- Aug. 10 Clear mostly; a low cloud in the N. A faint A.B. seen about 10^h. At 11^h it was bright with a few streamers. At 12^h it had diminished considerably.
 12 Clear. Suspected a slight A.B. about 10^h: saw no streamers.
 14 Partly clear. Some clear streaks in N. No A.B. seen at 10¹/₄^h.
 16 Clear. Suspected an A.B. At 9³/₄^h to 10^h from observatory saw no streamers. Moon.
 23 Partly ov't. No A.B. seen at 9¹/₄^h. Moon.
- Sept. 8 Nearly clear about 10¹/₂^h: had hardly a doubt that there was an A.B.; clouds interfered somewhat. Saw no streamers. (490)
- Oct. 31 Ov't to 10^h, and probably later.
- Nov. 1 Partially clear. No A.B. at 9^h.
 7 Clear. No A.B. to 8¹/₂^h. None at 10^h; yet a very slight suspicion.
 10 Clear. An A.B. seen about 10^h; faint in the moonlight, but very decided: some streamer-like appearances E. of N. Like a mass or bundle of streamers. (491)
 12 Clear. Moon. No A.B. seen at 10^h.
 25 Clear. No A.B. at 10^h.
- Dec. 1 Nearly clear. A low cloud above which, about 4° high, one or two streamers were seen by two persons about 6¹/₂^h. None seen after, nor were there any suspicions of an A.B. (492)
 11 Partly clear. Wholly so in the N. at 11^h: no A.B. seen.
 25 Ov't and snowing to 8¹/₂^h. Clear at 10¹/₂^h: no A.B.
 26 Clear. An A.B.: no form, but a diffused light. Saw no streamers, but have scarcely a doubt of an aurora. (493)

1851.

- Jan. 10 No A.B. seen at 10^h.
- Feb. 4 Cl'ds along the hor. from 3° to 8° high: cl'r above it: no A.B. at 9¹/₂^h.
 8 Clear. No A.B. at -^h.
 26 Clear. No A.B. at 8^h. None at 9¹/₂^h.
 27 Ov't (?) all the evening to 10^h, and probably later.
 28 Ov't to 9^h, and probably later.
- Mar. 1 Clear. No A.B. at 8¹/₂^h. None at 10^h.

1851.

- Mar. 2 Clear. No A.B. at 10^h.
 3 Nearly clear in the N. No A.B. seen at 10^h.
 4 Clear. No A.B. seen at 10^h.
 5 Partially clear. No A.B. seen at 10^h.
 6 Cloudy. Ov't to 9½^h.
 7 Ov't and snowing at 8^h.
 8 Ov't and drizzling rain to about 8^h: at 8½^h snowing again.
 9 Clear. Moon. No A.B. seen at 9½^h.
 10 Partially clear. No A.B. seen at 10^h. Moon.
 11 Clear. No A.B. seen to 10^h.
 12 No A.B. seen. Thinly ov't to 10^h.
 13 Clear. No A.B. seen at -^h. Low cloud in N. at -^h.
 14 Ov't to (10^h?)
 15 Ov't to 10^h, and probably later.
 16 Ov't to 9½^h.
 17 Ov't and stormy; probably all night.
 18 Ov't.
 19 Ov't to 11^h, and probably later.
 20 A few clear streaks: no A.B. Appeared rather light, but probably owing to the contrast.
 21 Clear. No A.B. to 9½^h.
 22 Clear. First noticed a general light about 8¾^h low down.
 23 Ov't, and rain about 9½^h.
 24 Ov't from 8^h to 10^h. Before 8^h no A.B.: many clouds.
 25 Clear. No A.B. to 8½^h: none at 10^h.
 26 Clear. No A.B. to 10½^h.
 27 Cloudless: haze obscured stars within 15° to 20° of the horizon.
 28 Clear. An A.B. First noticed streamers from the observatory at 9½^h: no arch and not much light; general light only at 11½^h.
 29 Clear. An A.B.; ill-defined arch 1° to 1½° high. A few streamers seen at 9^h.
 30 Ov't to 10^h, and probably later.
 31 Clear. No A.B. at 10½^h.
- Apr. 1 Cloudless but hazy. No A.B. seen to 10^h.
 2 Ov't and rainy to 9½^h. Ov't doubtless later.
 3 Clear. No A.B. to 10^h.
 4 Partially clear. No A.B. seen at 10^h to 11^h.
 5 Ov't, and some rain about 8½^h.
 6 Ov't to 10^h, and probably later.
 7 Sky covered with thin clouds to 9^h.
 8 Ov't to 10^h, and probably later.
 9 Clear. Moon. No A.B. seen at 10^h.
 10 Ov't. Moon shone clearly at 9^h, but no A.B. seen to 10^h.
 11 Ov't.
 12 Clear. No A.B. at 10^h.
 13 Clear. Moon. No A.B. at 9^h.
 14 Partially clear. Moon. No A.B. at 10^h.
 15 Ov't and rainy all night.
 16 Ov't, probably all night.
 17 Ov't and rainy, probably all night.
 18 Ov't.
 19 Ov't and rainy, probably all night.
 20 Ov't to 9½^h, and doubtless later.
 21 Ov't to 10^h, and probably later.
 22 Clear. No A.B. to 9½^h.

1851.

- Apr. 23 Mostly clear. Slightly cloudy. No A.B. at 10^h.
 24 Clear. No A.B. to 10^h.
 25 Clear. No A.B. to 10^h.
 26 Clear. No A.B. at 10^h.
 27 Clear. No A.B. at 10^h.
 28 Ov't to 10^h.
 29 Clear. No A.B. at 10^h.
 30 Ov't to 10^h, and some rain.
- May 1 Broken clouds in the N. about 8^h. Did not look out after that.
 Mr. E. W. Blake says there was an A.B. about 10½^h to 11^h: no streamers.
 2 Clear. No A.B. at 10^h.
 3 Ov't up to —^h.
 4 Ov't to 10^h, and raining.
 5 Ov't to 10^h, and raining.
 6 Clear. Moon. No A.B. seen.
 7 Ov't to 10^h.
 8 Sky filled with clouds at 10^h and 11^h.
 9 Thin cloud in N. Moon at 10½^h shone brightly. No A.B. seen.
 10 Ov't and rainy to 10^h, and doubtless later.
 11 Ov't and rainy to 9^h, and doubtless later.
 12 Ov't to 10^h, and probably later.
 13 Obs. impos. at 10^h. Cloudy all the evening.
 14 Clear. Moon about full. No A.B. seen at 10¾^h.
 15 No A.B. seen at 9^h to 10^h.
 16 Obs. hardly possible, on account of moon and clouds.
 17 Clear. No A.B. seen at 10^h.
 18 Clear. No A.B. seen at 9^h, nor before.
 19 Ov't, probably all night.
 20 Ov't. It was clear at 3^h A.M. of 21st. No A.B.
 21 Clear. No A.B. at 10^h.
 22 Ov't. A thunder shower at 9^h.
 23 Clouds interfered at 10^h. Think there was no A.B.
 24 Clear. No A.B. to 11^h.
 25 Clear. No A.B. at 10^h.
 26 Clear. No A.B. at 10^h.
 27 Ov't to 10^h. Some rain during the night.
 28 Clear. No A.B. at 10^h.
 29 Ov't and rainy.
 30 Ov't, probably all night.
 31 Clear. No A.B. at 10^h, or at 10¼^h.
- June 1 Ov't to 10^h and later.
 2 Clear. No A.B. to 10^h.
 3 Partially clear. Obs. almost or quite impos. the whole ev'g to 10^h.
 4 Clear. No A.B. to 10^h.
 5 Clear. An A.B.: no streamers seen: an arch 40° to 50° amplitude; broken and in patches. Moon.
 6 Ov't. Obs. impos.
 7 Ov't. Obs. impos. to 9½^h, and doubtless later.
 8 Ov't to 9^h.
 9 Ov't. Moon. Obs. impos.: some rain about 10^h.
 10 Clear. No A.B. seen to 10^h. Moon.
 11 Ov't, and thunder shower about 9^h.
 12 Clear. Moon. No A.B. seen about 10^h.

1851.

- June 13 Clouds obstruct the view. Moon. No A.B. seen at 10^h.
 14 Obs. nearly or quite impos. to 9^h; at 10^h nearly clear. Moon.
 No A.B. seen.
 15 Obstructed by clouds. Moon. Obs. nearly impos.
 16 No A.B. about 9^h.
 17 Clear. No A.B. at 10^½^h.
 18 Clear, but a little hazy: no A.B. seen about 11^h.
 19 Clear, a little hazy: no A.B. at 11^h.
 20 Clear. No A.B. at 10^h.
 21 Clear. No A.B. at 9^½^h.
 22 Ov't to 9^h, and probably later.
 23 Ov't to 10^½^h, and probably all night.
 24 Obs. impos. on account of clouds.
 25 Clear. No A.B. to 10^h.
 26 Clear first part of evening. Ov't at 10^h.
 27 Clear. I had scarcely a doubt of an A.B. about 9^½^h to 10^h. Saw
 no streamers, nor arch: general light. (494)
 28 Ov't. Obs. impos.
 29 No A.B. seen about 9^h.
 30 No A.B. seen about 10^½^h.
- July 1 Obs. impos. most of the evening.
 2 Obs. nearly impos.: part of the time to 10^h quite impos.
 3 Ov't; rain during the whole night at intervals.
 4 Clear. No A.B. seen at 8^½^h: too much daylight.
 5 Obs. impos. on account of clouds.
 6 Clear. No A.B. seen. Moon. A few clouds.
 7 Clear. Moon. Saw no A.B. at 10^h.
 8 Ov't: prob. all night.
 9 Ov't to 10^h, and prob. all night. Violent thunder shower.
 10 Obs. difficult on account of clouds. Moon.
 11 Hazy. Saw no A.B. at 10^h.
 12 Obs. impos. Clouds and moon. Some clear sky, but saw no A.B.
 13 Clear. Saw no A.B. to 9^h.
 14 Clear. Moon. No A.B. seen at 10^h.
 15 Ov't to 10^h.
 16 Ov't to 10^h in the N. and W.
 17 About 8^½^h first saw bundles of streamers: no arch visible, nor
 light except very low down. Did not watch it after 10^h: not
 much seen besides streamers to this time; some quite bright: alt.
 25° to 30°. (495)
 18 Partially clear. No A.B. seen to 10^h.
 19 Ov't.
 20 Clear. No A.B. at 9^h.
 21 Clear. No A.B. at 10^h.
 22 Clear, or mostly so. No A.B. at 10^h.
 23 Clear. No A.B. at 10^h.
 24 Ov't and rainy to 10^h, and ov't doubtless later.
 25 N. ov't all ev'g. Clear once when I rose in the night, but no A.B.
 26 Clear, except a low cloud which covered much of an aurora visible
 above it. A few streamers at about 9^½^h, and at 10^h only general
 light. (496)
 27 No A.B. at 9^½^h.
 28 Ov't.
 29 Clear. No A.B. at 10^h.
 30 Ov't.

1851.

- July 31 Clear. No A.B. at $9\frac{1}{2}^h$.
- Aug. 1 Ov't to 10^h .
- 2 Clear. Moon. No A.B. seen to 10^h .
- 3 Clear. Moon. No A.B. seen at $9\frac{1}{2}^h$.
- 4 Ov't.
- 5 Ov't mostly to 9^h .
- 6 Clear. Moon. No A.B. seen to $9\frac{1}{2}^h$.
- 7 Ov't to 10^h .
- 8 Clear. No A.B. seen to 10^h . Moon.
- 9 Ov't at $10\frac{1}{2}^h$. Some clear sky before this. Moon. No A.B. seen.
- 10 Ov't at 10^h .
- 11 Little clear sky in N. to $1\frac{1}{2}^h$. Then m'y cl'r in N. to $2^h 5^m$: no A.B.
- 12 Clear. No A.B. seen at $10\frac{1}{2}^h$. Moon.
- 13 Clear. No A.B. seen at $9\frac{1}{2}^h$.
- 14 Clear. No A.B. at 10^h .
- 15 Clear. No A.B. at 9^h .
- 16 Ov't to 10^h , and probably later.
- 17 Ov't and rainy to 10^h .
- 18 Clear. No A.B. at $9\frac{3}{4}^h$; a low cloud in the N.
- 19 Clear. No A.B. at 9^h to $9\frac{1}{2}^h$.
- 20 Ov't to 10^h , and probably later.
- 21 Ov't to 10^h , and doubtless later.
- 22 Clear at $9\frac{1}{2}^h$. No A.B.
- 23 Clear. No A.B. to 10^h .
- 24 Clear. No A.B. to 10^h .
- 25 Ov't to 10^h , and doubtless later.
- 26 Clear. No A.B. at 9^h .
- 27 Clear. No A.B. at 10^h .
- 28 Clear. No A.B. at $—^h$: very clear.
- 29 Clear. No A.B. at 10^h .
- 30 Clear. No A.B. at 9^h , or at $9\frac{1}{2}^h$.
- 31 Ov't at 9^h , and probably later.
- Sept. 1 Only partially clear. No A.B. seen at 9^h .
- 2 Clear. Moon. No A.B. seen at 10^h .
- 3 Clear. Moon. No A.B. seen at $9\frac{1}{4}^h$: about 8^h it was cloudy.
- 4 Clear. Moon. No A.B. seen at $8\frac{3}{4}^h$. (After 1^h A.B. of first class, reported to Prof. Denison Olmsted.) (497)
- 5 At 10^h slightly ov't.
- 6 Clear. Moon. About $8\frac{1}{2}^h$ saw two auroral arches, the upper 20° in alt. At 9^h only the lower arch was visible: red light in N.E. Saw but little more to 9^h , when it began to cloud over. At 10^h ov't thinly. (498)
- 7 Clear to 9^h , when it began clouding. At $8\frac{1}{2}^h$ saw an arch, or a fragment of one, and twice saw bright streamers with rapid lateral movement, after which clouds obscured the whole. Arch 19° alt.: dark bank below. (499)
- 9 Nearly clear. No A.B. seen. Moon.
- 10 Clear. No A.B. at $9\frac{1}{2}^h$. (A splendid A.B. seen about 1^h A.M. of 11th. See N. Haven Journal and Courier of the 15th.) (500)
- 11 No A.B. seen at $9\frac{1}{2}^h$.
- 12 Partly clear. No A.B. seen at $9\frac{3}{4}^h$. Moon.
- 13 Ov't and rainy to $9\frac{1}{2}^h$, and probably ov't later.
- 14 Clear. No A.B. seen at 10^h . Moon.
- 15 Clear. No A.B. seen at $9\frac{1}{2}^h$, none at $10\frac{1}{4}^h$. Moon.
- 17 Clear. No A.B. at 8^h , nor at 9^h .

- 1851.**
- Sept. 18 Clear. No A.B. at 9^h.
 19 Clear. No A.B. at 9^h to 9½^h.
 20 Clear. No A.B. at 10^h.
 21 Ov't to 10^h, and doubtless later.
 22 Ov't to —^h: at 10^h a little clear sky visible. No A.B. seen.
 23 Ov't to 9½^h, and doubtless later.
 24 Cold and clear. No A.B. at 9½^h; none at 10^h.
 25 No A.B. at 9^h; none at 9½^h.
 26 Ov't most of the evening. At 10^h nearly clear.
 27 Clear. No A.B. at 10^h.
 28 Clear. No A.B. at 9^h; none at 10^h.
 29 Partially clear. A splendid red Aurora. At 7^h 25^m fine exhibition of streamers converging from every point of compass. Those on the S. of the centre, or corona, (which was scarcely a corona,) 10° to 15° long. At 9½^h a fine exhibition still in the E. or E. by N. Clouds interfered very much. At 2¼^h A.M. Prof. Olmsted reports a dark segment in N., 8° high and 90° ampl. Streamers at 3^h 40^m. See New Haven Journal. (501)
 30 Ov't to 9^h, and prob. later.
- Oct. 1 Clear. Moon to 10^h. At 10½^h saw a large streamer or a bundle of streamers. Very little general light in N. (502)
 4 Clear. Moon. No A.B. seen from 8¾^h to 10½^h, from observatory.
 6 Mostly clear. No A.B. seen at 10½^h. Moon.
 7 No A.B. seen at 10^h to 10½^h.
- Nov. 30 Clear at 9^h. Obstructed with stratified clouds at 11^h. Moon. Appeared very light, but probably due to moonlight.
- Dec. 6 No A.B. seen at 9^h. Slightly suspected one about 7^h. Moon.
 10 Partially clear to 8½^h. Moon. No A.B. seen. At 11^h clear, down to within 4° or 5° of the horizon: no A.B. seen.
 21 Ov't.
 23 Nearly clear. Suspected an A.B. at 9^h. Saw no streamers, in a few minutes watching.
 29 M'y cl'r. A cloud on hor. 3° to 4° high; quite light above it. Moon.
- 1852.**
- Jan. 11 Clear at 7^h. No A.B. seen. Ov't at 9^h.
 15 Clear. No A.B. at 9¾^h.
 20 Clear, inclining to clouds. Some suspicions of an A.B. at 8¼^h.
 22 Clear. No A.B. seen from observatory to 8^h. None seen at 9¾^h; not a very good obs.
 25 Clear. No A.B. at 9^h. A very faint suspicion.
- Feb. 1 Clear. Moon. No A.B. seen at 10^h.
 13 Ov't up to 9^h.
 16 About 7^h saw a horizontal brush of light E. of N. across the handle of the dipper, Eta and Zeta, which almost immediately vanished. Soon another smaller brush, a degree or two lower down, appeared and vanished. Saw no other except an unusual light on the horizon. None at 9^h; at 10½^h a little cloudy. It was misty all the evening.
- Mar. 5 Nearly ov't. Clear at 10^h from horizon up 6° or 7°. No A.B. seen.
 6 Ov't to 10^h. At 4^h A.M. of 7th clear. Moon. No A.B. seen.
 8 Ov't to about 9^h: at 10^h, or a little after, nearly clear. No A.B. seen. It was a little suspicious, however.
- Apr. 11 Clear at Ridgefield, Conn. Susp. A.B. about 10^h: saw no streamers.
 3 Clear. Moon. No A.B. seen at 9^h.
 8 Clear. No A.B. to 9^h.

1852.

- Apr. 15 Clouds filled the N. at 10^h. There were strong indications of an A.B. I had scarcely a doubt. (503)
- 16 Clear. No A.B. at 10^h.
- 25 Clear. Moon. No A.B. seen at 9¹/₂^h.
- 30 Clear. Moon. No A.B. seen.
- June 1 Clear. Moon. No A.B. seen at 10^h.
- 2 Clear. Moon. No A.B. seen at 9¹/₂^h.
- 3 Ov't first part of evening; too hazy to obs. to 10^h.
- 5 Clear. About 9³/₄^h the whole N. was filled with streamers, from the horizon. Red light at 10¹/₂^h; some streamers; no arch; considerable general light.
- 18 Almost wh'y ov't: appeared quite susp. in places through the cl'ds.
- 19 Clear. No A.B. seen at 10^h.
- July 10 Clear. An A.B.: low arch on horizon nearly. Streamers at 8¹/₂^h; two arches. Settled down into general light at 10^h. (504)
- 11 Ov't to 10^h, and probably later.
- 12 Nearly ov't.
- 13 Nearly ov't. Obs. nearly impos. to 10^h.
- 19 Clear. No A.B. seen.
- 20 Ov't.
- 21 Clear. No A.B. seen at 10^h.
- 23 Clear. Moon. No A.B. seen.
- 28 Clear. Moon. No A.B. seen at 10¹/₄^h.
- Aug. 5 Ov't to 10^h, and probably all night.
- 18 Clear. No A.B.
- 19 Clear. No A.B.
- Sept. 4 Clear. No A.B. at 9¹/₂^h.
- 8 Clear. No A.B. at 10^h.
- 9 Clear. No A.B. at 10^h.
- 12 Clear. No A.B. at 9^h: slight susp. of one, but place of obs. bad.
- 15 Clear, but a little hazy. No A.B. at 10^h.
- Oct. 4 Ov't at 10^h.
- 16 Clear. No A.B. at 7^h, nor at 9^h.
- 21 No A.B. at 10^h.
- Nov. 2 Clear. No A.B.
- 7 Strongly suspected an A.B. No streamers seen at 9¹/₂^h.
- 29 Clear. No A.B. seen at 10^h. Moon.
- Dec. 1 Clear. No A.B. seen at 11^h. Moon.
- 11 Ov't up to —^h. Cleared away late; clear at 10¹/₂^h.
- 14 Clear. Suspected an A.B. at 8^h, and at 10^h; saw no streamers.
- 15 Clear. Moon. Slight suspicion of an A.B. at 8¹/₂^h.
- 22 Clear and cold. No A.B. seen from 7^h to 9^h. Moon.
- 31 Ov't.

1853.

- Jan. 15 Clear. Moon. Slight suspicions of A.B. about 10^h, but doubtful.
- 18 No A.B. seen at 9¹/₂^h.
- 20 Ov't.
- Mar. 3 Clear. Some suspicions of an A.B. at 10^h.
- 9 Cl'r. A.B. at 10^h and after: no streamers noticed; no arch. (505)
- 10 Clear. Strong suspicions, almost certainty, that there was an A.B. Saw no streamers at 10^h. (506)
- 13 Cl'r. Think there was an A.B.; saw no streamers: cl'ds interf. (507)
- 14 Clear. There was an A.B., I have hardly a doubt. No streamers seen about 10^h in five minutes watching. (508)
- 16 Nearly clear. Moon. No A.B. seen.

1853.

- Mar. 18 Clear. Moon. No A.B. seen.
 24 Ov't.
 25 Clear. No A.B. seen.
- Apr. 7 Clear. Slight suspicions of an A.B. about $9\frac{1}{2}^h$.
 16 Ov't.
 17 Ov't to 10^h , and probably later.
 18 Clear. Moon. No A.B. at $—^h$.
 19 Clear. Moon. No A.B. seen at $10\frac{1}{2}^h$.
 20 Rather hazy. Moon. No A.B. seen at $9\frac{1}{2}^h$.
- May 15 Clear. Moon.
 19 Clear. Moon. No A.B. seen at $9\frac{1}{2}^h$.
 22 Clear. Moon. No A.B. seen.
 26 No A.B. at $9\frac{1}{4}^h$.
- June 5 Clear. No A.B.
 9 Clear. An A.B. with streamers and broken arches about 9^h ; could not watch it long. (509)
 14 Clear: did not make much of an obs.
 15 Nearly clear.
 16 Clear. Moon. No A.B. seen at $9\frac{1}{2}^h$.
 19 Clear. Moon. No A.B. seen at 9^h .
 21 Not wholly clear.
 26 Mostly ov't at 10^h . At $9\frac{1}{2}^h$ some suspicions of an A.B. It may have been the effect of the rising moon.
- July 1 On N. Y. Central R.R. all night, clear, but saw no A.B.
 2 Clear, or nearly so: poor obs.
 16 Ov't.
 17 Partially clear. No A.B. seen at 10^h .
 21 Ov't.
 25 Ov't, probably all night.
 26 Ov't, probably all night.
 27 Clear. No A.B. at 10^h to $10\frac{1}{2}^h$.
 30 No A.B.
- Aug. 18 Clear. No A.B. seen at 10^h .
 22 No A.B. about 10^h .
- Sept. 15 Partially clear. No A.B. seen from 9^h to $9\frac{1}{4}^h$.
 18 Clear at 9^h . Moon. Saw no A.B.; could not see below 20° alt. from horizon.
 23 Clear. Moon. Think there was no A.B. at $9\frac{1}{4}^h$.
 26 Clear. No A.B. at 8^h , nor at 10^h .
 27 Ov't, probably all night.
- Oct. 28 Nearly clear. Suspected an A.B. about 10^h ; saw no streamers.
 29 Clear. No A.B. at 8^h or 10^h .
 31 Clear. About $8\frac{1}{4}^h$ to 10^h an A.B. No streamers; low light, arch of 30° to 40° extent. (510)
- Nov. 3 Clear. No A.B. at 10^h .
 15 Nearly clear. Moon. No A.B. seen at 9^h .
 17 Clear. Moon. No A.B. at 10^h .
- Dec. 5 Clear. Suspected an A.B. about 10^h : saw no streamers.
 12 Clear early in the evening, but cloudy later till 10^h .
 13 No A. B. seen at 9^h .
 16 Ov't.
 21 Ov't mostly. A bright appearance among clouds in the N. Think it was contrast.
 23 Nearly clear. About 11^h saw what resembled streamers among clouds: scarcely a doubt. (511)

1853.

- Dec. 27 Clear. No A.B.
 29 Clear. No A.B. at 9 $\frac{3}{4}$ ^h. None at 10^h.
 31 Ov't and snowing.

1854.

- Jan. 2 Clear. An auroral arch about 5° high at 8^h. Continued to decrease in altitude until 10^h. Nothing remarkable.
 7 Clear. No A.B. at 11^h.
 27 Clear at 10 $\frac{1}{4}$ ^h. No A.B.
 Mar. 15 Partly ov't, but among the clouds saw streamers at about 6 $\frac{1}{2}$ ^h. No great display of aurora seen. Clouds covered the northern sky at 10^h. (512)
 16 Clear. No A.B.
 27 Clear. An A.B.: low arch or bank of light; saw no streamers.
 28 Clear. An A.B. About 10^h and after, fragments of low arches, from which shot up fine streamers; but soon all diminished.
 29 Clear. Saw at 9 $\frac{1}{4}$ ^h a bright fragment of an auroral arch; 20° alt., East of North. No streamers seen; died away about 10 $\frac{1}{2}$ ^h, or before.
 Apr. 14 Ov't and snowing.
 15 Ov't.
 16 Ov't.
 18 Clear.
 May 22 Clear. No A.B. to 9^h.
 27 Clear. No A.B. to 9^h.
 June 21 Ov't.
 27 Ov't.
 28 Clear. Saw no A.B.: poor observation.
 Sept. 1 Ov't to 10^h, and doubtless later.
 2 Ov't to 10^h, and doubtless later.
 4 Clear. Moon. No A.B. seen.
 5 Ov't.
 6 Ov't.
 21 Clear. Fine A.B. Numerous streamers from an irregular bank of light on horizon. (513)
 22 Clear.
 23 Clear. No A.B. at 9^h.
 26 Clear. A fine arch of auroral light at 8^h, 5° or 6° altitude, 70° or 80° amplitude. No streamers. (514)

II. NOTICES OF AURORAS EXTRACTED FROM THE METEOROLOGICAL JOURNAL OF REV. EZRA STILES, S.T.D., FORMERLY PRESIDENT OF YALE COLLEGE; TO WHICH ARE ADDED, NOTICES OF A FEW OTHER AURORAS RECORDED BY OTHER OBSERVERS AT NEW HAVEN, CONN., collected and arranged by PROF. ELIAS LOOMIS.

Rev. EZRA STILES, S.T.D., was graduated at Yale College in 1746, and in 1749 became tutor in the College, in which station he remained six years. In 1755 he was ordained pastor of a church in Newport, R. I. In 1776 the events of the war dispersed his congregation, and induced him to remove to Dighton, Mass., and subsequently to Portsmouth, N. H. In 1778 he became President of Yale College, and continued in this station till his death, May 12, 1795.

President Stiles commenced a Meteorological Journal at Newport, in January, 1763, and continued it, with but slight interruptions, till May 10, 1795, only two days before his death. In this Journal he made frequent memoranda of the Aurora Borealis. These memoranda have been carefully selected from the Journal, and are embodied in the following catalogue.

Auroras observed at Newport, R. I., Lat. $41^{\circ} 29' N.$, Long. $71^{\circ} 18' W.$, by Rev. Ezra Stiles, S.T.D., formerly President of Yale College.

No.	
1	1763, Nov. 11. Coruscations reached two-thirds the way to the pole star, and extended 80° around the horizon.
2	1764, Jan. 23. Aurora Borealis.
3	" Mar. 5. Aurora Borealis.
4	" June 18. Aurora Borealis.
5	" Sept. 28. Aurora Borealis.
6	1767, May 16. Aurora Borealis.
7	1768, July 20. Aurora Borealis. Very extraordinary.
8	" Aug. 6. Aurora Borealis.
9	" Aug. 7. Aurora Borealis.
10	" Dec. 5. Aurora Borealis.
11	1769, Jan. 5. Aurora Borealis.
12	" Feb. 27. Aurora Borealis.
13	" Apr. 20. Aurora Borealis, 10° high.
14	" July 7. Aurora Borealis. Streams scarcely to pole star.
15	" July 8, 10 ^h P.M. Arch of aurora from N.W. crossed the meridian south of zenith. Passed a little south of Alpha Lyrae.
16	" Oct. 7. Aurora Borealis.
17	" Oct. 23. Aurora Borealis, streams.
18	" Oct. 24. Aurora Borealis.
19	" Oct. 25. Aurora Borealis.
20	1770, Jan. 17. Aurora Borealis.
21	" Jan. 18. Aurora Borealis.
22	" Feb. 28. Aurora Borealis.
23	" Mar. 23. Aurora Borealis.

- 24 | 1772, July 8. Great A.B. 9^h 40^m to 10^h and more. The streams reached nearly to the zenith, and broad sheets of light frequently ascending out of the north, and passing 60° or 70° in a second. The coruscations were white; little red.
- 25 | " July 25. Great A.B. at 9^h evening.
- 26 | 1773, Jan. 17. Aurora Borealis.
- 27 | " Jan. 18. Aurora Borealis.
- 28 | " Jan. 19. Aurora Borealis.
- 29 | " June 6. Aurora Borealis.
- 30 | " July 17. Extraordinary Aurora Borealis.
- 31 | 1774, Jan. 9. Aurora Borealis.
- 32 | " Mar. 3. Aurora Borealis.
- 33 | " Mar. 13. Aurora Borealis.
- 34 | " Mar. 15. Aurora Borealis.
- 35 | " Oct. 8. Aurora Borealis.
- 36 | " Dec. 1. Aurora Borealis.
- 37 | 1775, Jan. 29. Aurora Borealis.

Auroras observed at Dighton, Mass., Lat. 41° 48', Long. 71° 8' W.

- 38 | 1777, Jan. 28. Aurora Borealis.
- 39 | " Mar. 5. Aurora Borealis.

Auroras observed at Portsmouth, N. H., Lat. 43° 4', Long. 70° 45' W.

- 40 | 1777, July 27. Aurora Borealis.
- 41 | " Sept. 24. Aurora Borealis.
- 42 | " Nov. 27. Great Aurora Borealis.
- 43 | " Dec. 2. Aurora Borealis.
- 44 | 1778, Jan. 19. Aurora Borealis.
- 45 | " Feb. 17. Aurora Borealis.

Auroras observed at New Haven, Conn., Lat. 41° 18', Long. 72° 55' W.

- 46 | 1778, Sept. 22. Aurora Borealis.
- 47 | " Sept. 24. Aurora Borealis.
- 48 | " Sept. 25. Aurora Borealis.
- 49 | 1780, Mar. 2. Great Aurora Borealis.
- 50 | " Mar. 30. Aurora Borealis.
- 51 | " June 23. Aurora Borealis.
- 52 | " June 24. Aurora Borealis.
- 53 | " July 9. Great A.B. At 10¹/₂^h coruscations five degrees south of zenith, and south of Lyra. At 10¹/₄^h extended from N.W. to between the two stars in head of Draco and the great star in Lyra. Dark cloud under the pole star. Very red in N.E. at 10^h—rest white. At 10^h 18^m a beam arose from the horizon at E. 20° S., crossing the meridional coruscations E. and W., ranged 5° or 6° south of Lyra and south of zenith, two-thirds or three-fourths across the hemisphere. I judged it reached half way from the zenith to western horizon. At 10^h 25^m another horizontal or parallel coruscation crossed the Pole star. There were quadrangular fields of crossing beams. There was the greatest variety I ever saw.
- 54 | " July 11. Aurora Borealis.
- 55 | " July 27. Aurora Borealis.

56 1780, July 28. This evening we beheld a very singular aurora. At 8^h 5^h P.M. Mr. Atwater saw the aurora in S.E., aloft between Lyra and Aquila.

8^h 24^m. A coruscation rose in the horizon E. 20° S., and in that region a sheet of redness extending southerly, and a sheet of whiteness adjoining northerly. None from the pole.

8^h 25^m to 28^m. Sheet of dusky redness spread round from east to south, or to 20° west of south, and so round the edge of the horizon, to above half way up to the zenith. Indeed the southern and especially the S.E. part of the hemisphere was generally affected with aurora, while there was nothing of it in the north.

8^h 29^m. Considerably evanescent in some parts, remaining in others.

8^h 45^m. Aurora arises in the north, and spreads not in coruscations, but a sheet of whiteness up to the zenith.

8^h 50^m. The whole hemisphere filled with light, E., W., N. and S. visible through mackerel clouds.

9^h. White aurora, extensive, covering to south of zenith.

9^h 36^m. Streams of white aurora arising from N.W., passing by the easternmost star of Ursa Major, coming thence over to the meridian, and perhaps 30° S. of zenith, ranging along on west side of Lyra and Aquila, and to south of Aquila, forming a sheet of light covering those stars, yet so transparent that the stars appeared well through it.

9^h 40^m. Streams vanish; north aurora continues; a black cloud lying along under the pole star.

9^h 50^m. Extends to Jupiter; luminous W. and E.

10^h 2^m. The whole hemisphere overcast with large fleeces of clouds, upon a luminous back ground. A large luminosity due south, and perhaps 10° high. The north luminous though without coruscations.

10^h 10^m. Very luminous in N.E., or nearer east.

57 " July 29. Aurora Borealis.

58 " Aug. 2. Aurora Borealis.

59 " Sept. 21, 11^h. A.B. as high as uppermost pointer in Ursa Major, next to and under pole star.

60 " Oct. 30, 10^h. A.B. around under the pole, 8° or 10° high.

61 " Nov. —. A small aurora.

62 " Nov. 19, 10^h. A.B. one-third up to pole star. After midnight coruscations extend above the pole star. It maintained its splendor till obliterated by the dawning day.

63 " Nov. 20. Aurora Borealis as last night.

64 " Nov. 22. Aurora Borealis.

65 " Nov. 23. Small Aurora Borealis.

66 " Nov. 25. Great Aurora Borealis, 15° high.

67 " Nov. 26, 7^h. Aurora in north. At 8^h aurora had overspread the hemisphere, and apparently for two hours high all around the horizon. Very light white in the south.

At 8^h 15^m dense black cloud from north passed slowly over toward the south. Two splendid luminosities N. by W., and N. by E. At midnight clear starlight, clouds all gone. Only aurora under pole.

68 " Nov. 27, 10^h¹/₂. Aurora an hour high all around the horizon.

69 " Nov. 28. Aurora Borealis.

- 70 1780, Nov. 29. Small Aurora Borealis.
 71 " Dec. 15. Small Aurora Borealis.
 72 " Dec. 19. Aurora Borealis.
 73 " Dec. 27. Very small Aurora Borealis.
 74 1781, Jan. 17. Considerable Aurora Borealis.
 75 " Jan. 21. Very splendid A.B. From a permanent sheet of white light, reaching half way from the horizon up to the pole, and extending one-third round the horizon, there ascended streams or coruscations of red aurora near three-quarters of the way up to the zenith. At 9^h there was an intensely red sheet in the N.E. which gradually moved westward over the Great Bear and the pole star into the N.W., where it wore away and disappeared. The ascending red coruscations also moved gently along from E. to W., playing very beautifully. The luminous field began in the evening, the coruscations and red movable field came on a little before 9^h, were at their height when the clock struck nine, and the whole of the playing scene might have continued about a quarter of an hour. The columns were so movable and variable, and the heavens put on so many different appearances every few minutes, that it is impossible to describe them. The summits of the highest coruscations in their motion westward passed perhaps 15° off of Gemini, and crossed the northern meridian within 30° of the zenith; that is, reached 55° or 60° above the horizon. The eastern azimuth limit might be nearest east, or less than half a point north; the western azimuth between N.W. and W., nearest to N.W. At 9½^h there remained a strong permanent field of whiteness, or steady luminous aurora, 20° or 30° wide along under the pole. The eastern limb passed and touched Cor Leonis, and so the azimuth would be due east, or more exactly E. 2° S. The easternmost sheet overspread the mane of Leo, reaching toward Leo Minor.
- 76 " Jan. 29. Small Aurora Borealis.
 77 " Feb. 15. Aurora Borealis, 10° high.
 78 " Mar. 16. A.B. dim and small, perhaps 8° or 10° under pole.
 79 " Mar. 27. A great Aurora Borealis this evening. I first saw it about a quarter before nine, when it was only luminous from the horizon up about one-third of the way to the pole star. No dark cloud subjacent as usual. Afterward there seemed at times an intermixture of dark cloud. At 9^h or a little after, coruscations arose and played in beautiful profusion, rising as high as the pole star. An arch 5° wide formed from the east horizon across over to the western horizon, perhaps 5 or 6 minutes before 10^h. At 10^h it passed over the pole star and Ursa Minor. The coruscation ceased from the luminous field under the pole. At 10^h 20^m coming over south, or the summit of the arch moving further above the pole star, and on toward the zenith, so as to touch the stars in the tail of Ursa Major. The breadth of the arch or auroral zone was equal to the distance of the two pointers or more, that is, five degrees broad. The arch is complete nearly from horizon to horizon, though at the eastern extremity a little dubious. All this while, light one hour high, under the pole star, but no coruscations. By 10^h 20^m the arch had risen so

as to touch the stars in the Bear's tail, and began to vanish or decay from the pole westward. East end of the arch touched the horizon at E. 2° S. by compass. Touched the western horizon W. 20° N. by compass.

At $10^h 32^m$ I found the east end ascending from the horizon, passed through Alpha of the northern crown, and through the tail and back of the Great Bear, touching Beta and Gamma.

At $10^h 37^m$ all the arch west of the pole and meridian vanished, except a lucid beam or pyramid. At $10^h 44^m$ a renewal of the arch westward. Arch south of Beta and Gamma Ursæ Majoris. A new horizontal beam arising under the pole, where the auroral lucidity continues. At $10^h 48^m$ nearly vanished, breaking up apace. At $10^h 52^m$ whole arch quite vanished. At 11^h aurora under the pole still, and extending N.E. as high as Cor Aquilæ, and to bright stars in Cassiopeia, and a sensible light as high as the pole star.

At $11^h 10^m$ aurora continues in the north under the pole, and a lucidity on Cor Aquilæ. At midnight, dark cloud lying along under the pole, interstreaked with horizontal lights. Aurora seems breaking up.

The bow continued for three-quarters of an hour, the most of the time well defined, all the time rising toward the zenith, passing 32° on the meridian in forty or forty-five minutes. But the horizontal ends of the bow or zone did not move so much.

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| 80 | 1781, Mar. 28, at $11\frac{1}{2}^h$, a small Aurora Borealis. |
| 81 | " Apr. 13. Considerable Aurora Borealis about $9\frac{1}{2}^h$. |
| 82 | " Apr. 14. Small Aurora Borealis. |
| 83 | " Apr. 15. Faint Aurora Borealis, low. |
| 84 | " Apr. 17. White A.B., two-thirds up to pole. |
| 85 | " May 11. A.B. 2 hours high, and three-fourths round the horizon. |
| | Observed at East Hartford, Conn. |
| 86 | " May 17. Considerable A.B.; observed at Brimfield, Mass. |
| 87 | " June 7. A.B. 30° high; from N. 30° E. to S. 5° W. |
| 88 | " June 9. Aurora Borealis, great and diffused. |
| 89 | " June 20. Small Aurora Borealis. |
| 90 | " July 9. Small Aurora Borealis. |
| 91 | " Aug. 8. Small A.B., coruscations two-thirds up to pole star. |
| 92 | " Aug. 17. Small Aurora Borealis. |
| 93 | " Aug. 20. Small Aurora Borealis. |
| 94 | " Sept. 18. Aurora Borealis, 5° high. |
| 95 | " Sept. 25. At $7^h 20^m$ an arch about 20° above the horizon inclining toward the west. At $8\frac{1}{4}^h$ the coruscations tend toward a point in the zenith, one streak in the west very red: ascend in flames similar to the coruscations from a large fire. The flashes extended nearly to the S.W. The flashes ascended with great rapidity. Its continuance about a quarter of an hour. At $8\frac{3}{4}^h$ an arch similar to the first, about 30° high. At an instant, another arch over the first about 40° high, both inclining toward the west. Streaks up from the first arch, very bright, but no flashing. The coruscations ascend in the form of a cone. They point in the zenith. Immediately upon that, the flashing began in the east and west with great rapidity. A bright moonlight evening. At 9^h little or no appearance of any light. |

- 96 1781, Oct. 15. A.B. first appeared at 8^h. At 11^h very bright and flashes with rapidity, of a red cast, in the west, 45° above the horizon.
- 97 " Nov. 19. A.B., white and red coruscations. At 9^h the main body of light as high as in Great Bear. The coruscations in N.W. ascended above the pole star.
- 98 " Dec. 11. Small Aurora Borealis, 15° high.
- 99 1782, Mar. 10. Aurora Borealis, 6° high.
- 100 " Apr. 1. Small Aurora Borealis, faint, 15° high.
- 101 " Apr. 13. Aurora Borealis, light, 10° high.
- 102 " May 4. Great A.B. At 8^h 10^m streams ascended from N.E. to the zenith. At 8^h 18^m coruscations from east round to west by north, meet in the zenith, and at their southern limit formed an arch from horizon to horizon, passing through the tail and back of Leo, and a little northward, but very nearly touching Cor Leonis. Vanished in a few minutes. Black clouds lying along under the pole. At 8^h 30^m came over to the southern horizon, partly in vertical streams and partly by luminous nubeculæ oblongæ, and other seemingly detached spots filled the southern hemisphere. A very light zone of perhaps five degrees around the whole west and south and east edge of the horizon. Luminous sheets of brightness up aloft in east and in west. Dark cloud still under the pole.
- At 8^h 45^m confused in south, coruscations in north. At 9^h striæ and coruscations. At 11^h north hemisphere over-spread with great blotches of dark cloud, interspersed with light clouds. Aurora gone in south.
- 103 " May 6. Small Aurora Borealis.
- 104 " May 24. Aurora Borealis, arched.
- 105 " June 1. Aurora Borealis, 20° high.
- 106 " June 6. Small Aurora Borealis.
- 107 " July 20. At 10^h auroral arch from west a little north, ascending and crossing a little south of zenith.
- 108 " Aug. 5. Aurora Borealis, small.
- 109 " Aug. 12. Aurora Borealis, small.
- 110 " Aug. 26. Aurora Borealis. At 10^h, arch half way up to pole.
- 111 " Aug. 27. Small Aurora Borealis.
- 112 " Aug. 28. Small Aurora Borealis.
- 113 " Sept. 9. Small Aurora Borealis.
- 114 " Sept. 13. Small Aurora Borealis.
- 115 " Sept. 30. Aurora Borealis, 8° high under the pole.
- 116 " Oct. 1. Small Aurora Borealis. Observed at Newport, R. I.
- 117 " Oct. 9. Small Aurora Borealis. Observed at Newport, R. I.
- 118 " Nov. 26. Aurora Borealis, 5° under pole.
- 119 1783, Jan. 26. Aurora Borealis, small.
- 120 " Feb. 1. Aurora Borealis, small.
- 121 " Feb. 27. Aurora Borealis, 5° high.
- 122 " Mar. 24. Aurora Borealis, 10° high.
- 123 " Mar. 27. Aurora Borealis, small.
- 124 " Mar. 29. Very great Aurora Borealis. At 7^h 34^m arch from W. by N., near Venus, passed through belt of Orion and N. of Sirius. At 7^h 37^m touched Rigel, Sirius, and Cor Hydræ. At 7^h 39^m arose a new stream from nearest west, and ascended through Rigel to Sirius, 5° wide. At the same time a con-

fluence of columns from all the N.W. and N. to the zenith concurring in the two stars in heads of Gemini. At 7^h 44^m all these over, but new ones rising and playing. At 7^h 59^m another arc in north, passed under the pole. At 8^h 1¹/₂^m pyramids playing from the upper limb. At 8^h 11^m coruscations concur between Gemini and the two stars in the head of Leo, or in midst of Cancer, and on the meridian 12° south of the zenith; but evanishing and faint.

At 8^h 15^m a new arc rose from S.W. horizon, touched Orion, Rigel, Sirius, or a little below, and passed round to eastern horizon. At 8^h 20^m the south arc, or remnant of it, crossed through Lepus, 5° south of Rigel, and 2° or 3° south of Sirius. A branch issuing from it ascended through Sirius. At 8^h 30^m south faint arc remaining and sinking further south, or below Sirius and Lepus. All the south in aurora dim or dull and faint, down to south horizon, and perhaps 40° each side the meridian, the upper side a curved limb perhaps half way up from the horizon to Sirius. At 9^h heavens full of aurora. I left observing.

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| 125 | 1783, Apr. 2. | Small Aurora Borealis. |
| 126 | " Apr. 7. | At 8 ^h 50 ^m A.B., arc 5° wide up within 5° of pole star. |
| 127 | " Apr. 24. | Small Aurora Borealis. |
| 128 | " Apr. 27. | Small Aurora Borealis. Arc 3° high along under pole. |
| 129 | " May 2. | Small Aurora Borealis. |
| 130 | " June 1. | Aurora Borealis. |
| 131 | " July 28. | Aurora Borealis. |
| 132 | " Aug. 1. | At 9 ^h 5 ^m saw an auroral beam arising from W. 19° N. perhaps 15° above the horizon, ascending about Berenice's hair, thence between Arcturus and Cor Caroli, and ranged near or through the northern crown, through the stars in Hercules' hip. At 9 ^h 30 ^m crossed the meridian and passed south of Lyra, when there ascended another stream from E. horizon and joined that from the west about the vertex. It described a crooked path, the upper part bending southward. At 9 ^h 40 ^m evanished. |
| 133 | 1784, Nov. 15. | Aurora Borealis. |
| 134 | 1785, May 9. | Aurora Borealis. |
| 135 | " June 5. | Aurora Borealis and Australis. |
| 136 | " July 3. | Aurora Borealis. |
| 137 | " Aug. 9. | Aurora Borealis, small. |
| 138 | " Sept. 8. | Aurora Borealis, large. |
| 139 | " Nov. 29. | Aurora Borealis, small. |
| 140 | 1786, Feb. 28. | At 10 ^h A.B.; from a dark cloud 15° high issued coruscations to the pole star. |
| 141 | " Mar. 13. | Great Aurora Borealis. |
| 142 | " Mar. 19. | Great A.B. Auroral arch from E. to W., half way up to the pole star; striæ or streams up to pole. |
| 143 | " Mar. 20. | Aurora Borealis. |
| 144 | " Mar. 21. | Aurora Borealis. |
| 145 | " Mar. 22. | Great A.B. By 9 ^h the coruscations spread over the northern half of the hemisphere, and arches E. and W. crossed 20° south of the meridian. At 9 ^h 5 ^m a beam from the E. ascended and passed over Spica Virginis then nearly on the meridian; at the same time another from the west touched Sirius with its south limb, and in five or six minutes it evanished. |

- 146 1786, Mar. 23. Aurora Borealis.
 147 " Mar. 27. Great Aurora Borealis.
 148 " Apr. 11. Aurora Borealis.
 149 " Apr. 26. Small Aurora Borealis.
 150 " May 1. Aurora Borealis.
 151 " May 19. Aurora Borealis.
 152 " May 22. Aurora Borealis.
 153 " June 19. At 10^h A.B. all round the horizon to 20° high.
 154 " June 30. At 10^h great Aurora Borealis. Streams to zenith.
 155 " July 1. A fine auroral arch arising a little S. of E., perhaps 8° or 10° S. of E., and ascending from the horizon crossed the meridian and terminated near the western horizon, or within 10° of it. It might be 4° or 5° wide. At 10^h 30^m passed through β Serpentarii, south of Northern Crown, Zeta Aquilæ, Eta of the Dolphin, through Arcturus. West end evanished, and soon re-blazed, and the whole arch shone again.
 At 10^h 53^m, moves southward. At 11^h, 5° south of α Aquilæ, α Serpentarii, and Arcturus, crossing the meridian about 32° south of the zenith. Ended in the head of Virgo. Vanishing.
 At 11^h 6^m evanished, having lasted above half an hour, in which time the whole arch moved southward perhaps 10°.
- 156 " July 2. Aurora Borealis.
 157 " Aug. 18. Aurora Borealis.
 158 " Aug. 22. Considerable A.B. Patches and spots or clouds of aurora all over the hemisphere, from the northern to the southern horizon.
 159 " Aug. 24. Aurora all over the horizon north and south, and in spots aloft.
- 160 " Oct. 16. Aurora Borealis.
 161 " Oct. 17. Aurora Borealis.
 162 " Nov. 13. Aurora Borealis.
 163 " Nov. 15. Aurora Borealis.
- 164 1787, Mar. 20. A.B. 60° high. Fine and beautiful coruscations.
 165 " Mar. 21. Aurora Borealis.
 166 " Mar. 23. Aurora Borealis.
 167 " May 19. Aurora Borealis.
 168 " June 2. Aurora Borealis.
 169 " June 9. Aurora Borealis.
 170 " June 16. Aurora Borealis.
 171 " June 18. Aurora Borealis.
 172 " July 1. Aurora Borealis.
 173 " July 4. Aurora Borealis.
 174 " July 13. Great A.B. At 9^h 30^m auroral arch crossed south of the zenith from east to west, passing through Arcturus and Alpha Aquilæ, its southern limb touching those stars. It continued permanent, and was not wholly obliterated at 10^h. Vast coruscations ascending from the north up to the zenith and beyond. At 11^h aurora still great.
- 175 " July 14. Great Aurora Borealis.
 176 " Sept. 6. Aurora Borealis.
 177 " Oct. 31. Aurora Borealis.
 178 " Dec. 9. Aurora Borealis.
 179 1788, Feb. 5. Large Aurora Borealis.

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| 180 | 1788, Feb. 11. | Aurora Borealis. |
| 181 | " Apr. 29. | Aurora Borealis. |
| 182 | " May 4. | Aurora Borealis. |
| 183 | " May 25. | Aurora Borealis. |
| 184 | " May 28. | Aurora Borealis. |
| 185 | " July 30. | Aurora Borealis. Two coruscations from nearly east and west met in the vertex, crossing the meridian about 10° south of the zenith. At 10^h the auroral light seems to have spread over the whole hemisphere to the southern horizon; though more faintly southward than northward. |
| 186 | " Aug. 1. | Aurora Borealis. |
| 187 | " Aug. 2. | Aurora Borealis. |
| 188 | " Aug. 23. | Aurora Borealis. |
| 189 | " Aug. 26. | Aurora Borealis, very bright. |
| 190 | " Aug. 27. | A.B., very bright, north and south round the horizon. |
| 191 | " Aug. 28. | A small Aurora Borealis. |
| 192 | " Aug. 29. | Aurora Borealis. |
| 193 | " Aug. 31. | Aurora Borealis, north and south. |
| 194 | " Sept. 2. | Aurora Borealis. |
| 195 | " Sept. 3. | Aurora Borealis. |
| 196 | " Sept. 4. | Aurora Borealis. |
| 197 | " Sept. 5. | Aurora Borealis. |
| 198 | 1789, Feb. 15. | Aurora Borealis, 7^h to 10^h . |
| 199 | " Mar. 27. | Aurora Borealis. |
| 200 | " Mar. 31. | Aurora Borealis. |
| 201 | " Apr. 26. | Aurora Borealis. |
| 202 | " May 21. | Aurora Borealis. |
| 203 | " May 22. | Aurora Borealis. |
| 204 | " May 23. | Great A.B. All the northern hemisphere emblazoned with columns and conical streams of light. The western striæ, red and white, ranged by Jupiter at $9^h 25^m$, and immediately an arch of light struck across the northern hemisphere at about 40° height on the north meridian. Streams struck up from N.E., and closed or completed an entire arch across from horizon to horizon at $9^h 31^m$, crossing the meridian south of the zenith by a star which I take to be Alpha Lyrae. |
| 205 | " May 28. | Aurora Borealis. |
| 206 | " May 31, 3^h A.M. | Large Aurora Borealis in north and spreading round into the south. The heavens look pied with white, light, clouds and darkness. |
| 207 | " June 12. | Aurora Borealis. |
| 208 | " June 15. | Aurora Borealis. |
| 209 | " June 16. | Aurora Borealis. |
| 210 | " June 18. | Aurora Borealis. |
| 211 | " July 10. | Aurora Borealis. |
| 212 | " July 14. | Aurora Borealis. |
| 213 | " July 17. | Aurora Borealis. |
| 214 | " July 26. | Aurora Borealis. |
| 215 | " July 28. | Aurora Borealis. |
| 216 | " Oct. 19. | Aurora Borealis. |
| 217 | " Nov. 14. | A grand Aurora Borealis and Australis, the striæ and coruscations shooting up and playing all over and round every part of the hemisphere. Luminous spots and beautiful red and flaming pyramidal columns ascending to the zenith. At 10^h was formed a grand auroral crown exactly on the me- |

ridian: the center of which was near Beta in Aries, and about 4° S.W. from Alpha Arietis, 20° south of the zenith of Yale College. From this center proceeded every way, N., S., E., and W., radial beams half way down to the horizon; besides a red beam or arch or broad stream which then crossed from east to west through the coronal center from horizon to horizon, or very nearly. A dim arch or luminous circle or belt, round through the southern board, crossing the meridian about two-thirds the way from the zenith to the south horizon. Below which was a penumbral darkness, which in five or six minutes became tinged with red to the southern horizon. About $10^h 10^m$ or sooner the vertical crown became faint and evanishing. It lighted up again with new playing, varying and alternately evanishing striæ or radii. I examined the celestial globe, and found the stars near the center to be the two stars in the head of Aries, which were on the meridian at $10^h 35^m$ nearly; at which time the crown was much obliterated, though the heavens are full of aurora. At 11^h the radii continue, proceeding to S.E., S., and S.W., but chiefly S.E. and nearly S., then a chasm, and then streams to S.W. and W., but the extremities of the radial beams are dissipated about the center. Yet there is still a redness in the southern board, down to the horizon, and perhaps an hour and a half high. In the northern board the whole semi-hemisphere is covered with a dim whitish sheet of light like the dawn of day. In the height of the phenomenon I read the *New Haven Gazette* by the auroral light. I never before saw so splendid and universal an aurora. At 12^h aurora north and northwest.

218	1789, Dec. 24.	Aurora Borealis.
219	1790, July 3.	Aurora Borealis.
220	" July 16.	Aurora Borealis.
221	" Sept. 6.	Aurora Borealis.
222	1791, July 22.	Aurora Borealis, small.
223	" Dec. 26.	Aurora Borealis, small.
224	" Dec. 27.	Aurora Borealis, small.
225	1792, Oct. 13.	Great Aurora Borealis.
226	1793, Jan. 14.	At 7^h , Aurora Australis south two points east. Gone at 8^h .
227	" Sept. 2.	Aurora Borealis.
228	1794, Nov. 11.	Aurora Borealis.

Notices of Auroras extracted from various Journals kept at New Haven, Conn., and not included in either of the preceding lists.

No.	
1	1802, July 1. The Aurora Borealis made its appearance between 8^h and 9^h ; the northern part of the horizon was considerably illuminated, but the brightest part was E. of North when first observed, but moved slowly westward, till it was rather W. of N. In the north, the light went up in streaks to about the height of 30° , but this appearance ceased about 10^h , though the light continued. A little after 10^h a streak of light shot up in the East and extended itself a little north of the zenith almost to the western part of the horizon. <i>Dwight.</i>

- 2 1803, Jan. 13. Aurora Borealis about 10^h. *Dwight.*
- 3 1803, Mar. 19. Large Aurora, very bright. *Leffingwell.*
- 4 " Sept. 19. A bright Aurora Borealis. *Leffingwell.*
- 5 1804, Apr. 1. Aurora Borealis. *Day.*
- 6 " May 2. Aurora Borealis with streamers. *Day.*
- 7 1805, Sept. 15. Aurora Borealis. *Day.*
- 8 " Sept. 24. Aurora Borealis. *Day.*
- 9 1806, Jan. 11. Aurora Borealis. *Day.*
- 10 " Mar. 16. Aurora Borealis. *Day.*
- 11 1807, Apr. 11. Aurora Borealis. *Day.*
- 12 " May 8. Aurora Borealis. *Day.*
- 13 1814, Apr. 17. Aurora Borealis. *Day.* Seen at Cincinnati, Ohio.
- 14 " Sept. 11. Aurora Borealis. *Day.* Seen at Cincinnati, Ohio.
See Daniel Drake's Picture of Cincinnati. 12mo, 1815, pp. 245-6.
- 15 1818, June 6. Aurora Borealis. *Day.*
- 16 " Sept. 20. Aurora Borealis. *Day.*
- 17 " Sept. 26. Aurora Borealis. *Day.*
- 18 1819, Feb. 19. Aurora Borealis. *Day.*
- 19 " Oct. 12. Aurora Borealis. Bow from East to West. *Day.*
See Nash's Diary for 1821, p. 79.
- 20 " Nov. 13. Aurora Borealis. *Day.*
- 21 1820, May 1. Aurora Borealis. *Day.*
- 22 1827, Jan. 18. Aurora Borealis very bright at 9^h with a few faint coruscations extending 45° on each side of the north point, having its vertex under the north star, and rising 8° or 10° above the horizon. *Herrick.*
- 23 " Aug. 27. Aurora Borealis. *Herrick.*
- 24 " Aug. 28. Remarkable auroral arch between 9^h and 11^h in the form of a broad belt extending from the West to the East. *Am. Jour.*, vol. xiv, p. 91.
- 25 " Sept. 8. Aurora Borealis very brilliant. *Herrick.*
- 26 " Sept. 9. Aurora Borealis. Faint light in the north a little before 9^h. Saw an arc of a bow in the N.W. extending upward about 5°. *Herrick.*
- 27 " Sept. 25. Aurora Borealis. About 6^h 40^m the northern half of the heavens was suffused with a red light, which gradually disappeared except in the north and by east, where it increased in intensity. At the same time radii of light of a white color extended from and between the W., N. and E., and met in a center directly in the zenith. Jets of light of a bright orange color appeared in the east, which gradually approached the S.E. when they were hid by the clouds. About 8^h 45^m the clouds began to roll away to the eastward, when the northern half of the hemisphere was of a whitish color. The light was now chiefly confined to the east, where a red light shone brilliantly: but upon the clouds moving off, the light shot up in various directions between the north and east. *Herrick.*
- 28 " Nov. 9. A red appearance in north, resembling the reflection of a burning house about 8^h. Vanished and a white light resembling a cloud succeeded. *Herrick.*
- 29 1828, Jan. 16. Aurora Borealis which lasted all night. *Olmsted.*
- 30 " Jan. 19. Aurora Borealis from 9½^h last evening till day break, a mild light extending from N.N.W. to N.E. about 5° in height. *Herrick.*

- 31 1828, Feb. 12. At 9^h 15^m Aurora Borealis appeared in the north, sending up some pretty distinct and luminous columns. Disappeared soon. *Herrick.*
- 32 “ Aug. 14. Aurora Borealis between 8^h and 9^h. Columns of light at intervals between N.W. and N.E. rose to the height of 15°, constantly changing their situation and intensity of light. In a half hour, it settled down into a white cloud. *Herrick.*
- 33 1828, Sept. 26. Aurora Borealis in the form of a white cloud reaching from N.W. to E.N.E. The upper edge gradually rose and brightened and the lower part faded until it had the appearance of a bow, in height about 10°. *Herrick.*
- 34 1829, Dec. 19. Aurora Borealis continued for several hours although obscured by clouds during the greater part of the evening. *Herrick.*
- 35 “ Dec. 20. Aurora Borealis in form of a diffuse light extending 5° above the horizon. *Herrick.*
- 36 1830, Nov. 20, 10^h. A splendid Aurora Borealis. *Olmsted.*
- 37 1833, May 17. Aurora shooting out luminous columns toward the zenith, occupying a space of 170° in azimuth. It exhibited exceedingly rapid coruscations or flashes of light. *New Haven Daily Herald.*
- 38 “ July 10. Very brilliant Aurora.
- 39 “ Nov. 13. An auroral light in the east. *Am. Jour.*, vol. xxv, p. 384.
- 40 1834, Nov. 2, 8^h. An uncommon brightness like the dawn in the north, lasted with fluctuations all night. *Loomis.*
- 41 “ Nov. 5. At 7½^h the entire horizon from the west point almost to the east, was lighted up like the dawn with very considerable brightness. The brightest point about N. 30° W. *Loomis.*
- 42 “ Nov. 6. Between 8^h and 9^h an auroral bank of light in the N.W. *Loomis.*
- 43 1834, Nov. 28. At 8^h a faint auroral light extends along the northern horizon from the east almost to the west point. *Loomis.*
- 44 “ Dec. 4. At 8^h a slight auroral appearance in the north. *Loomis.*
- 45 “ Dec. 6. At 8^h a very evident illumination in the east. At 9^h from N. to E. the openings in the clouds are quite luminous. At 10^h the clouds broke away and showed the horizon from N.W. to N.E. to be all in a glow—a very bright and extensive bank of light. No arches or streamers. *Loomis.*
- 46 “ Dec. 21. At 9¼^h a faint aurora in the N. At 9½^h illumination very bright directly in the north, extending about 30° in azimuth, and 6° or 7° in altitude. *Loomis.*
- 47 “ Dec. 22. Aurora very bright through partial openings in the clouds a few degrees E. of N. *Loomis.*
- 48 “ Dec. 23. At 6^h cloudy, yet a small spot in the N.E. horizon very bright. Not faded at all at 7^h. *Loomis.*
- 49 1835, Jan. 29. Slightly hazy—manifest illumination—brightest point about 20° E. of North. *Loomis.*
- 50 “ Sept. 4. At 2½^h A.M. a bright auroral bank of light with brilliant streamers. *Loomis.*
- 51 “ Nov. 17. Remarkable aurora. *Am. Jour.*, vol. xxix, p. 388.
- 52 “ Nov. 18. A diffuse light was spread all along the northern horizon, and rose to a considerable elevation. *Loomis.*
- 53 “ Dec. 10. An unusual auroral cloud. *Am. Jour.*, vol. xxxii, p. 217.

- 54 1835, Dec. 21. Auroral arch. *Loomis*.
 55 1836, Apr. 22. A magnificent aurora with streamers. *Am. Jour.*, vol. xxxi, p. 85.
 56 1836, May 8. A remarkable auroral arch. *Am. Jour.*, vol. xxxii, p. 224.
 57 " July 31. Aurora with a few streamers a little before 8 o'clock. *Olmsted*.
 58 " Aug. 2. 15^m before 10 o'clock—more vivid than on the 31st; slightly pink. *Olmsted*.
 59 " Aug. 12. A remarkable auroral arch. *Am. Jour.*, vol. xxxii, p. 220.
 60 1837, Jan. 2. At 8^h 5^m a distinct but not very bright arch of light about one degree broad extending very nearly from due north to due south. The sky was overcast except in the N.W. region. At 8^h 22^m it was still quite plain. *Herrick*.
 61 " Jan. 25. Aurora Borealis unusually magnificent with a profusion of beautiful rose-red colors. About 7^h 30^m the corona was formed, and nearly the whole heavens were suffused with a deep crimson. A second paroxysm occurred about 10^h 30^m more grand than the first. The center of the corona was quite distinct. *Am. Jour.*, vol. xxxii, p. 177.
 62 " Feb. 18. About 8^h a large tract of a dim and uncertain red about half way between the zenith and the western point. At 9^h in the N.E. an illuminated region about 10° wide and 15° high. The color was a beautiful red. The color soon became more intense, and reached the maximum about 9^h 30^m. The light by turns became brighter and fainter several times between this period and 11^h, when it entirely disappeared. *Am. Jour.*, vol. xxxii, p. 396.

The following notices of Auroras are extracted from a Meteorological Journal kept at Sharon, a village 50 miles northwest of New Haven, by Hon. John C. Smith, former Governor of Connecticut. It is presumed that all these Auroras might have been seen at New Haven, although they are not mentioned in the New Haven Journal.

- 63 1828, Dec. 1. Aurora Borealis.
 64 1830, Apr. 15. Aurora Borealis.
 65 " Dec. 11. Aurora Borealis.
 66 " Dec. 12. Aurora Borealis.
 67 1831, Feb. 6. Aurora Borealis.
 68 " Apr. 19. Remarkable Aurora Borealis.
 69 1832, June 27. Aurora Borealis.
 70 " Aug. 23. Aurora Borealis.

General Summary.

The following Table presents a summary of the preceding auroral observations, classified by months.

Years.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Sum.
1763-1775	9	2	5	1	1	2	6	2	1	5	1	2	37
1777-1778	2	1	1	0	0	0	1	0	4	0	1	1	11
1780	0	0	2	0	0	2	5	1	1	1	10	3	25
1781	3	1	3	4	2	3	1	3	2	1	1	1	25
1782	0	0	1	2	3	2	1	5	3	2	1	0	20
1783	1	2	3	4	1	1	1	1	0	0	0	0	14
1784-1785	0	0	0	0	1	1	1	1	1	0	2	0	7
1786	0	1	7	2	3	2	2	3	0	2	2	0	24
1787	0	0	3	0	1	4	4	0	1	1	0	1	15
1788	0	2	0	1	3	0	1	8	4	0	0	0	19
1789	0	1	2	1	5	4	5	0	0	1	1	1	21
1790-1794	1	0	0	0	0	0	3	0	2	1	1	2	10
1802-1820	2	1	2	3	3	1	1	0	6	1	1	0	21
1827-1830	3	1	0	1	0	0	0	3	4	0	2	5	19
1831-1836	1	1	0	2	2	1	2	3	1	0	7	7	27
1837	2	1	1	2	1	3	5	5	5	4	7	4	40
1838	5	5	2	3	1	2	4	3	8	1	4	1	39
1839	5	2	3	2	6	2	2	4	7	4	6	2	45
1840	5	2	4	5	3	0	3	4	3	4	5	6	44
1841	3	6	5	4	1	2	2	4	6	4	3	2	42
1842	1	2	0	4	0	0	1	0	2	0	1	0	11
1843	0	0	2	1	1	1	1	0	2	1	0	1	10
1844	2	0	0	1	1	0	0	1	0	1	2	2	10
1845	2	1	0	3	1	0	3	3	3	2	1	3	22
1846	2	1	1	4	4	1	0	4	3	7	1	2	30
1847	1	1	2	1	1	1	2	1	3	0	6	3	22
1848	3	9	2	5	3	1	4	3	1	4	13	5	53
1849	2	4	2	1	0	1	2	0	4	2	1	1	20
1850	1	4	4	2	2	0	3	2	5	4	1	2	30
1851	2	1	3	0	1	2	2	0	5	5	0	0	21
1852	1	5	2	3	6	5	3	1	6	3	4	3	42
1853	1	1	5	3	3	2	1	1	2	1	1	1	22
1854	3	1	5	2	2				2				15
Sum.	63	59	72	67	62	46	72	66	97	62	86	61	813

The least number of auroras was observed in the month of June, viz: 46; and the greatest number in the month of September, viz: 97. The deficiency in June may be ascribed in part to the influence of twilight, which during that month at New Haven lasts till half past nine, while the observations were not generally continued after 10 o'clock. If we classify the observations by seasons we shall have in

Spring,	201 auroras.		Autumn,	245 auroras.
Summer,	184 "		Winter,	183 "

If we make a proper allowance for the interference of twilight in summer, we must conclude that Auroras at New Haven are more common in summer than in winter; that is, they occur least frequently in winter, and most frequently in autumn. The same conclusion has been derived from a comparison of a considerable number of observations in Canada, and also at the Academies in the State of New York.

The inequality in the number of auroras upon successive years is much more remarkable. From 1763 to 1794, auroras averaged 7 per year; and during eight of these years the average was 20 per year. From 1795 to 1826, a period of 32 years, only 21 auroras were recorded, being an average of only two in three years; while from 1837 to 1854, auroras averaged 29 per year, and there were six years in which at least 40 auroras per year were recorded. It is true that during the latter period, a systematic watch for auroras was maintained, and most of the time by two independent observers, so that it is probable that nearly every aurora which could have been seen has been recorded. Moreover, many of these auroras were very faint, such as most meteorological observers would not notice; and even if they had noticed them, would not think them worthy of being recorded in a Meteorological Journal; while from 1795 to 1826, it is presumed that no particular watch for auroras was maintained. Under such circumstances, it is probable that during the latter period a good many small auroras may have occurred which failed to be noticed. But it is impossible to avoid the conclusion that auroras were much more frequent during the 33 years succeeding 1826, than during the preceding 33 years. From 1837 to 1854 not a year passed without at least one conspicuous aurora, and generally there were at least three or four sufficiently conspicuous to attract considerable attention. But from 1804 to 1820 a very faithful meteorological Journal was kept by Pres. Day, of Yale College, (at that time Professor of Natural Philosophy,) who only recorded 17 auroras, adding in one case the remark, "with streamers," and in a second case, "Bow from E. to W." Yet Prof. Day was born in 1773, and was therefore of an age to remember many of the splendid auroras which were recorded by President Stiles. He was therefore perfectly familiar with the appearance of auroras, and was well aware how great interest these phenomena had once excited. He still remembers (1865) several auroras which occurred before he entered college, and, in particular, the grand aurora of Nov. 1789, which occurred when he was Freshman in college; and he well remembers at present that during the period from 1800 to 1820, auroras were much less frequent, and less splendid than they had been during his boyhood.

These recollections of President Day are abundantly confirmed by his own written testimony. When Professor of Natural Philosophy, he was accustomed to deliver a course of written lectures on Meteorology to the Senior Class of Yale College; and in his lecture on the Aurora, written in 1811, and still preserved, on page 5th, after describing that form of the Aurora

which consists of a bank of light rising only a few degrees above the northern horizon, he adds, "*So far as I have learned, scarcely any other has been seen in New England for 15 or 20 years past.*"

And again, on page 12th, having described the revival of the Aurora in Great Britain, about the beginning of the last century, after an absence of more than a hundred years, he adds, "It is said that the Aurora Borealis has been occasionally seen in New England ever since its first settlement; but its appearance became more remarkable about the time of its return in so extraordinary a manner in Europe. For 15 or 20 years past, they seem to have lost their brilliancy, and generally present nothing for our admiration but a regular zone of light extending along the Northern verge of the horizon."

The comparative infrequency of Auroras during the early part of the present century, was a subject of general remark among meteorological observers. In the Ladies' and Gentlemen's Diary for 1821, published at New York and edited by M. Nash, on page 79th, in noticing the aurora of Oct. 12, 1819, the editor remarks "The northern lights, or Aurora Borealis, for about 40 years, have appeared less frequently than heretofore. During a considerable part of this period, they have, for a number of years together, totally disappeared. Within a few years of late, we have had a few exhibitions of this sublime, and beautiful spectacle."

When therefore a magnificent aurora made its appearance in August, 1827, it excited general surprise, and only aged people could remember having seen an equally brilliant display.

The Auroral observations made in the neighborhood of Boston lead to substantially the same conclusions as have been derived from the observations at New Haven. In the Memoirs of the American Academy, Vol. 9, pp. 112-120, Prof. Lovering has given a Catalogue of Auroras, observed at Cambridge, Boston and Salem from 1742 to 1848. This list embraces 624 recorded auroras, of which, however, 79 are duplicates, leaving 545 independent auroras. Of these, 136 occurred on the same nights mentioned in the New Haven registers, leaving 409 new cases not recorded at New Haven, and making a total of 1222 different Auroras recorded in the combined series of observations. The following Table exhibits a summary of all the observations at both places from 1742 to 1839, counting the same night but once, although it may have been mentioned in three or four independent Journals. Since 1839, the Boston catalogue contains no date not found in the New Haven catalogue.

Summary of observations at New Haven and Boston.

Years.	Jan.	Feb.	Mar.	April.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Sum.
1742-1749	2	4	4	3	2	3	2	3	3	1	4	6	37
1750-1753	3	5	2	6	1	1	2	1	1	1	2	0	25
1757-1760	1	0	4	1	1	0	0	1	7	3	3	0	21
1761-1765	1	3	3	1	3	3	4	8	6	1	3	1	37
1767-1769	1	2	0	1	1	3	6	4	2	7	0	2	29
1770-1772	2	3	3	2	1	2	8	4	4	3	3	1	36
1773-1775	5	3	6	1	1	6	10	4	2	1	2	1	42
1776-1778	3	2	5	6	1	3	3	0	8	1	3	2	37
1779-1780	0	3	2	1	0	2	5	1	1	1	10	3	29
1781	3	1	3	4	2	3	1	3	2	1	1	1	25
1782	0	0	1	2	3	2	1	5	4	5	1	0	24
1783	2	3	7	4	3	1	1	1	0	0	0	0	22
1784-1785	0	0	0	0	1	2	1	1	2	1	3	2	13
1786	0	2	10	6	5	3	8	6	3	5	5	2	55
1787	2	5	3	3	4	7	6	4	2	5	3	3	47
1788	2	2	2	2	4	0	4	8	9	5	0	0	38
1789	0	3	5	3	7	9	10	2	3	4	1	4	51
1790	0	2	0	0	2	2	3	1	1	1	1	0	13
1791	2	0	2	2	0	0	4	0	0	0	0	2	12
1792-1795	3	0	1	1	1	0	3	2	2	3	1	1	18
1802-1810	4	0	2	3	3	2	1	1	4	1	2	0	23
1811-1820	0	2	2	2	1	1	0	0	5	1	2	0	16
1821-1826	0	0	0	1	0	0	0	0	0	1	0	1	3
1827-1830	3	1	0	1	0	2	0	3	4	0	2	5	21
1831-1836	1	1	0	2	2	1	2	3	1	0	7	7	27
1837	2	1	1	2	1	3	5	5	5	4	7	5	41
1838	5	5	2	3	1	2	4	3	8	1	4	1	39
1839	5	2	3	2	6	4	2	4	7	4	6	2	47
1742-1839	52	55	73	65	57	67	96	78	96	61	76	52	828
1840-1854	29	38	37	39	29	16	27	24	47	38	39	31	394
1742-1854	81	93	110	104	86	83	123	102	143	99	115	83	1222

If we classify the entire series of observations by seasons we shall have in

Spring,	300 auroras.	Autumn,	357 auroras.
Summer,	308 “	Winter,	257 “

showing that in New England, Auroras occur most frequently in autumn and least frequently in winter.

The inequality in the number of Auroras upon successive years exhibits an unexpected consistency. This is exhibited in the following Table showing the number of Auroras seen annually for a period of 112 years.

Average number of auroras annually.

Years.	Auroras annually.	Years.	Auroras annually.	Years.	Auroras annually.	Years.	Auroras annually.
1742-49	5	1783	22	1821-26	1	1845	22
1750-53	6	1784-85	7	1827-30	5	1846	30
1757-60	5	1786	55	1831-36	5	1847	22
1761-65	7	1787	47	1837	41	1848	53
1767-69	10	1788	38	1838	39	1849	20
1770-72	12	1789	51	1839	47	1850	30
1773-75	14	1790	13	1840	44	1851	21
1776-78	12	1791	12	1841	42	1852	42
1779-80	15	1792-95	5	1842	11	1853	22
1781	25	1802-10	3	1843	10	1854	15
1782	24	1811-20	2	1844	10		

These numbers exhibit a very steady increase from 1742 to 1786-89, with the exception of the years 1784-5. The middle of the period of maximum abundance may be fixed at 1787, the average number of Auroras for four years amounting to 48. From this date, the number declines rapidly and uninterruptedly to near 1820. The middle of the period of minimum frequency may be assigned for 1816, when the average number of auroras did not exceed one per year. From 1827 the numbers increase, and after 1837 the number is very remarkable, the average for five years from 1837 to 1841 being 42 per year. Then for three or four years there is a marked decline, and a subsequent revival which is most decided in 1848 and 1852. Regarding this as a single period of maximum abundance, the middle of the period occurred not far from 1845, making thus an interval of 58 years from the maximum in 1787 to that of 1845.

It is then established beyond question that during the last century, the frequency of Auroras in New England has been subject to an inequality bearing some resemblance to an Astronomical periodicity—the period being about 58 years; but whether this period is uniform can only be established by observations continued for a much longer interval of time.

III. ON BEKKER'S DIGAMMATED TEXT OF HOMER. BY PROF. JAMES HADLEY.

It is more than forty years since Richard Payne Knight published in 1820 his famous digammated Iliad, or rather Vilviad, of Homer. The book has taken its place among the curiosities of literature. Its author was an ingenious and elegant scholar; but he had his hobby, and he rode it unmercifully. The horse of Phidippides, the spendthrift son in Aristophanes' Clouds, was marked with a *Κόππα* (*κοππατίας*). Payne Knight's hobby was branded with another lost letter of the primitive Greek alphabet, the Digamma: wherever he goes, he bears the digamma with him.

It is one of the most remarkable circumstances about Payne Knight's Iliad, that more than twenty years after its publication, a distinguished American scholar should have thought it worth while to reproduce three books of it on this side the ocean (see Anthon's Homer, New York, 1844). A page or two by way of specimen might have been amusing at least, even if uninteresting: but to take up in this way more than fifty pages of a schoolbook was to make the joke somewhat ponderous.

It might have been expected that the example of Payne Knight would deter succeeding editors from repeating an experiment which in his hands had turned out in a way at once so unfortunate and so ludicrous. But Immanuel Bekker, the Coryphaeus of recent textual criticism, has not shrunk from the hazard. In 1858 he brought out an Iliad and Odyssey in which the lost letter is admitted to a place in the Homeric text. This work embodies the results of many years' minute and laborious study. In 1809, after the appearance of Wolf's Homer in its third edition, Bekker, then a young man, reviewed it in the Jena Litteratur-Zeitung. The review is said to have shown great mastery of the subject, and great aptitude for those critical labors which were to form the life-work of its author. In 1843 he published a new recension of the Homeric text, which was immediately and universally recognized as a marked advance on that of Wolf. For the last five or six years he has been giving out in the Monatsberichte of the Berlin Academy a highly remarkable series of observations and researches in reference to Homer. With great inge-

nuity and acuteness, they evince an amount of patient labor which is absolutely marvellous. Thus he goes through the whole extent of the poems to note and collect the verses in which the third foot is without a caesura. In the 15694 verses of the Iliad, he finds only 185 which have no caesura in the third foot: in the 12101 of the Odyssey, only 71. Again he goes through the whole extent of the poems, to mark the cases of bucolic caesura, and observe whether the fourth foot, the one which precedes the caesura, is a dactyl or a spondee. Thus in the fifth book of the Iliad he finds 531 bucolic caesuras, of which 470 are preceded by dactyls, 61 by spondees: in the eleventh book, 575 bucolic caesuras, 478 preceded by dactyls, 97 by spondees; and so on for the other books. These are only specimens of the tasks which this conscientious and indefatigable critic has imposed upon himself. The results of these protracted investigations appear in his last edition of the Iliad and Odyssey, that of 1858. This edition shows a great advance upon his first of 1843. It is in fact constructed on a different principle and aims at a different object. The aim of Bekker in his first edition, like that of Wolf before him, was in general to reproduce the Homeric text as it was settled by the great critic Aristarchus about two centuries before Christ, and handed down without intentional variation by subsequent copyists. It was the rule with Wolf, and with Bekker in his first edition, to give the readings which certainly or probably belonged to Aristarchus, except in occasional instances where there was unequivocal evidence to show the priority of a different reading. But in his second edition Bekker has taken a wider range. He has adopted as his guide the principle of analogy, and by the help of it has sought to go back beyond Aristarchus. Relying on analogies presented by a careful study of the Homeric poems, he has departed in many cases from the readings of the manuscripts, even where these could be traced with more or less certainty to Aristarchus himself. The general propriety of this method has been disputed in many quarters. It is indeed rather singular in a critic like Bekker, who strenuously maintains the fragmentary origin of the poems, and who finds evidence of such an origin in the varieties and inconsistencies which they show both as to grammatical forms and as to the use of words. He expects departures from analogy; he regards them as having an a priori probability; and yet the tendency of his criticism is to sweep them away from the text, wherever this can be done by gentle means: for he abstains on principle from changes of a violent or extreme character; he does not treat his text with the despotic ingenuity of a Bentley.

But our object at present is to consider only one feature of the work—its introduction of the digamma. The objectors generally admit that the digamma-sound (the *v*, or rather the *w*-sound) belonged originally to the Homeric poems, and that it is proper in commentaries and other philological works to point out the traces of its existence and to discuss the extent of its use. But they object to a digammated text. They maintain with much plausibility that the poems from their first reduction to writing have never shown this letter; and that the attempt to go back, not only beyond the first manuscripts that we have, but beyond the first that ever existed, can have no reasonable hope of success. At any rate, they say, the case is not yet ripe for a digammated text. In regard to many words it is still uncertain whether they were or were not sounded with a digamma in the Homeric time; and in regard to many which certainly were so, it is doubtful whether they were uniformly sounded with this letter, or whether it was not sometimes omitted in pronunciation. If we take words which certainly had a digamma in the Homeric language, and attempt to represent them uniformly with this letter, we must make many violent and arbitrary changes of the text. If we adopt the principle of giving them with digamma wherever it can be done without such changes, we have to draw an uncertain line between changes which are violent and changes which are not so. And whichever of these courses we take, we can have no assurance that we are reproducing the genuine Homeric usage. It is impossible to deny the force of these objections. But their force would be much greater, if by the decree of fate the world were restricted to one printed text of Homer, just this and no more. In that case we should say without hesitation, give us a text which comes as nearly as possible to that which Aristarchus—following, as we know that he did, with great soberness and caution, the testimony of the best manuscripts that he could find—fixed upon as the true one; or, if you depart from that, do so only when there is decisive evidence to warrant the departure. As a basis for Homeric study, as a standard for general use and reference, a text thus constituted is the best that we can have. But we are by no means restricted to a single text. For general purposes, we may continue to use Bekker's first edition, or we may take, what differs very little from it, the text of Dindorf in Teubner's Bibliotheca, or any better one which we can find constructed on the same principles. But Bekker's second edition will still have its value as a tentative, to show how far the principle of analogy, in the hands of a consummate critic, will serve to correct and improve

the text of Homer which has come down to us by tradition from the ancient Alexandrine editors. And especially with reference to the digamma it will have a value of this kind, as showing what results can be secured by an intelligent, moderate, and cautious attempt to reinstate the long-lost Homeric letter. On this point the editor himself says in his brief and pithy preface: "The Aeolic letter, after it had disappeared through time and negligence, was by the marvellous sagacity of Bentley reclaimed from oblivion; but lay thus for a long time, ridiculed by wits, by scholars invidiously assailed or unintelligently defended [the last evidently a hit at Payne Knight]. By Heyne it was admitted, at least into his commentary. The indispensable uses of this letter I could no longer treat with contempt. I have therefore restored the digamma, but so far only as I had the power and right to do, proceeding cautiously and with moderated step: I have restored it to its own place, as indicated by manifest traces, not by eager wishes or by hasty assumptions of my own."

This language is fully borne out by an inspection of the book. The carefulness and conscientiousness of the editor are everywhere apparent. In deciding what words are to be regarded as having the digamma, he relies mainly on the indications of the Homeric verse. From this it follows as a natural consequence that he recognizes only an *initial* digamma. Thus he writes *Διός* of Zeus, *κλήϊς* *key*, *ὄϊς* *sheep*, not *Διφός*, *κλήφϊς*, *ὄφϊς*, though there is strong reason, derived from inscriptions or from later dialects or from cognate tongues, for believing that these words had digamma in the Homeric language. He does not, however, reject the initial digamma of a word, when it is brought by a prefix or by composition into the middle. Thus the digamma of *ἑλικοσι* *twenty* is retained in *ἐἑλικοσι*, that of *ῥάγνυμι* *to break* in *ἐῤάγη* *was broken*, that of *ῥέλλομαι* *to hope* in *ῥέφολπᾶ* *I hope*, that of *ῥιδεῖν* *to see* in *ῥΑῖδης* (*unseen god*) *Hades*, that of *ῥηδύς* *sweet* in *μελιῤηδής*, *μελιῤηδέα* *φοῖνον* *honey-sweet wine*. He rejects all combinations of digamma with another consonant. Thus *δήν* *long*, which in numerous passages has the appearance of beginning with two consonants, and has been supposed by many to have the digamma-sound after the *δ* (*δῤήν*), is by Bekker always written with a simple *δ*. In *δεῖδια* *I fear*, many, since Buttmann, have recognized a Homeric *δέδῤια*; in *ἔδδεια* *I feared*, a Homeric *ἔδῤεια*: but Bekker always writes them according to the traditional way, only omitting one *δ* from *ἔδδεια*. Nor does he recognize any lost letters beside digamma. Curtius, in the second part of his *Principles of Greek Etymology*, has endeavored to show that a consonant *y*-sound

has in some instances given rise to the same appearances in the Homeric verse as those occasioned by the *v*- or *w*-sound (the digamma). But the words which are thus supposed to show traces of initial *y*, Bekker either writes with digamma, or leaves them with a vowel-initial. We shall refer again to this point before closing.

We have said that in determining what words had initial digamma in the Homeric language, our editor relies mainly on the indications of the Homeric verse. Having satisfied himself in the case of any particular word that it did have the digamma, he proceeds to write the word, as also its derivatives and compounds, with that character: and this he does, not only where metrical reasons favor or require the introduction of a consonant, but wherever metrical reasons do not absolutely forbid the introduction of a consonant. In very many instances where the verse as we have it in our traditional text will not allow the digamma to come in, the difficulty can be removed by changes of the text which are more or less obvious. Bekker's principle, it is evident, has been to write the word with digamma, whenever this is consistent with the verse as it stands in the ordinary text, or can be made so consistent by some slight and easy change of reading. He shows his judgment and moderation as a critic by refusing (at least, in general, with only rare exceptions) to make any considerable or arbitrary change of reading for the sake of getting in his digamma. Rather than do this, he will allow the word to appear in a particular case without the initial consonant which usually belongs to it. I may illustrate his mode of procedure by a more particular statement of what he has done in the first book of the Iliad. In the 611 lines of which it consists, there are found, if I have counted right, 162 which show the digamma. But some of these contain it more than once, so that 184 words are written with this character. In 36 of these, it is found, not at the absolute beginning of the word, but after a preposition or other prefix. Of the 184 words there are only 31, or about a sixth, in which the introduction of the digamma has required any further change of text; and in 18 of these 31, the only change required has been the omission of a movable *ν* from the end of a preceding word. Thus in verse

- | | |
|--|--------------------------------|
| 14. στέμματ' ἔχων ἐν χερσὶν ἐκηβόλου Ἀπόλλωνος. | B. χερσὶ <small>φεκ.</small> |
| 96. τοῦνεκ' ἄρ' ἄλγε' ἔδωκεν ἐκηβόλος ἥδ' ἔτι δώσει. | ἔδωκε <small>φεκ.</small> |
| 294. εἰ δὲ σοὶ πᾶν ἔργον ὑπέλομαι, ὅτι κε νῆπιος. | ὅ τι κε <small>φελπης.</small> |

In 8 instances, a slight change has been made in the grammatical form of the preceding word, though in 2 out of the 8 the change was

not necessary in order to the introduction of the digamma. The other six are as follows:

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|--|---------------|
| 21. ἀζόμενοι Διὸς υἱὸν ἐκηβόλον Ἀπόλλωνα. | B. υῖα φεκ. |
| 230. δῶρ' ἀποαιρεῖσθαι, ὅς τις σέθεν ἀντίον εἴπη. | ἀντία φείπη. |
| 288. πάντων μὲν κρατέειν ἐθέλει, πάντεσσι δ' ἀνάσσειν. | πᾶσιν δὲ φαν. |
| 365. οἴσθα· τίη τοι ταῦτ' εἰδυῖη πάντ' ἀγορεύω. | ταῦτα φιδυῖη. |
| 482. στείρη πορφύρεον μέγ' Ἰαχε νηὸς ἰούσης. | μέγα φιαχε. |
| 576. ἐσθλῆς ἔσσεται ἦδος, ἐπεὶ τὰ χερσεῖονα νικᾷ. | ἔσται φῆδος. |

In three instances a particle which seemed unnecessary has been omitted to make room for the digamma:

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|--|--------------|
| 64. ὅς κ' εἴποι ὅτι τόσσον ἔχόσατο Φοῖβος Ἀπόλλων. | B. ὅς φείπη. |
| 548. οὔτε θεῶν πρότερος τόνγ' εἴσεται οὔτ' ἀνθρώπων. | τόν φείσ. |
| 582. ἀλλὰ σὺ τόνγ' ἐπέεσσι καθάπτεσθαι μαλακοῖσιν. | τόν φεπ. |

In two instances one particle has been substituted for another:

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|---|-----------------|
| 19. ἐκπέρσαι Πριάμοιο πόλιν εὔ δ' οἴκαδ' ἰκέσθαι. | B. καὶ φοίκαδ'. |
| 395. ἢ ἔπει ὦνησας κραδίην Διὸς ἦε καὶ ἔργω. | ἦε τι φέργω. |

I do not find in the first book any instance in which words are transposed for the sake of bringing in the digamma. I will add one or two instances from other parts of the poems:

- | | |
|--|---------------------------|
| χ, 341. μεσσηγὺς κρητῆρος ἰδὲ θρόνου ἀργυροῦλου. | B. κρητῆρος μεσσηγὺ φιδέ. |
| ψ, 370. ἔστασαν ἐν δίφροισι· πάτασσε δὲ θυμὸς ἐκάστου. | θυμὸς δ' ἐπάτασσε φεκ. |

There are several instances in the first book where a word usually digammated is compelled by stress of metre to forego this addition. The lines which I have noted are

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|--|-------------------|
| 216. χρὴ μὴν σφωῖτερόν γε, θεά, φέπος εἰρύσσασθαι. | not φειρύσσασθαι. |
| 239. πρὸς Διὸς εἰρύαται· ὃ δέ τοι μέγας ἔσσεται ὄρκος. | φειρύαται. |
| 294. εἰ δὴ σοὶ πᾶν ἔργον ὑπείξομαι, ὅτι κε φείπης. | ὑποφείξομαι. |
| 438. ἐκ δ' ἐκατόμβην βῆσαν ἐκηβόλῳ Ἀπόλλωνι. | φεκηβόλῳ. |
| 555. νῦν δ' αἰνῶς δειδοίκα κατὰ φρένα μή σε παρλείπη. | παρφαλείπη. |

My search was a hasty one. It is most likely that careful looking would bring out a few more cases of this kind.

Before proceeding to notice and criticise the treatment of particular words, there are two remarks of a general nature which it seems important to premise. They relate to the evidence in favor of a digamma, and the evidence against a digamma, in the case of any particular word.

First as to the evidence in favor, it must always be borne in mind that there are cases in which hiatus was more or less freely allowed

in the epic verse, so that hiatus occurring in such cases furnishes little, if any, presumption for an initial digamma. In my Grammar (67 D) are mentioned three cases of this kind:—1. When the first of two words ends in a close vowel (*ι, υ*) and seldom or never suffers elision: this applies especially to the dative singular of the third declension; as *παιδί ἔπασσε*.—2. When the two words are separated by a clearly required mark of punctuation; as *κάθησο, ἐμῷ δ' ἐπιπείθεο μύθῳ*.—3 (the most important case). When the vowels which make hiatus are the two short syllables of the third foot, or, in other words, at the feminine caesura of the third foot; as *τῶν οἱ ἐξ ἐγένοντο ἐνὶ μεγάροισι γενέθλη*. In this place it has been proved that hiatus is allowed with much the same freedom as at the end of a verse. There is another case which ought to be added to these three—a case in which hiatus is easily excused, if not freely allowed—and that is, after a long vowel or diphthong in arsis, and particularly the arsis of the third or the fifth foot. The first line of the Iliad is an instance in point:

1. *μῆνιν ἄειδε, θεά, Πηληϊάδεω Ἀχιλῆος*.

which shows hiatus after the arsis of the fifth foot: after the arsis of the third, we find it in *A*,

24. *ἀλλ' οὐκ Ἀτρεΐδῃ Ἀγαμέμνονι ἦνδανε θυμῷ*.

42. *τίσειαν Δαναοὶ ἐμὰ δάκρυα σοῖσι βέλεσσιν*.

Here also, after the long arsis of the third foot, as well as in the feminine caesura of that foot, we find something of the same freedom as at the end of a verse. This appears in such lines as *A*,

153. *δεῦρο μαχησόμενος, ἐπεὶ οὐ τί μοι αἵτιοι εἰσιν*.

where *ος*, the last syllable of *μαχησόμενος*, stands in the third arsis before *ἐπεὶ*, which certainly did not begin with digamma.

The other remark relates to the negative evidence, that which goes to disprove a digamma. It is well known that for every digammated word, even the best ascertained, there is some evidence of this character: there are some passages in the poems as we have them, in which the digamma cannot be written without violating the metre. It is obviously desirable that we should have some idea as to the range of these exceptional cases, their numerical ratio to the whole number of passages in which the word occurs. On this subject there are some good remarks in Kuhn's *Zeitschrift*, X, 60 ff, in an article by H. L. Ahrens on *ἐκαστος*, one of the words which Bekker has digammated. Ahrens enumerates all the instances, 110 in number, where this word occurs in the Iliad, and states that there are 44 of these in which the digamma could not be written into the traditional text without a violation of metre. But as 16 of the 44 can be made to

admit the digamma by simply dropping a movable ν from the preceding word, they are left out of the count, which reduces the unconformable cases to 28 in 110, or about 25 per cent. This ratio, Ahrens says, is so large as to throw discredit on the initial digamma. To prove it so, he takes the word $\alpha\nu\alpha\varsigma$ (originally $\phi\acute{\alpha}\nu\alpha\varsigma$) *king*, which he finds to occur 151 times in the Iliad. Here setting aside, as before, the cases in which only a movable ν stands in the way of the digamma, he makes 11 out of 151 to be the number of unconformable cases, or about $7\frac{1}{2}$ per cent. He then proceeds to say that as to other words which have an unquestionable digamma, as $\xi\rho\gamma\omicron\nu$, $\iota\delta\epsilon\iota\nu$, $\omicron\iota\chi\omicron\varsigma$, $\omicron\iota\nu\omicron\varsigma$, etc., any one may satisfy himself by his own observation that the percentage of unconformable cases is not larger, that it is rather smaller, than for $\alpha\nu\alpha\varsigma$. It could not justly be inferred from these observations of Ahrens, that no words had the digamma in Homer, for which the unconformable cases exceed 7 or 8 per cent; but only that in such words the digamma must be regarded as more or less doubtful, and if the proportion is very much greater, as improbable. It is also evident that the weight to be given to this test will depend somewhat on the absolute number of instances in which a word is found. If the word occurs but seldom, the ratio of conformable and unconformable cases may be in a measure accidental; but the influence of accident diminishes, as the numbers we are dealing with increase.

We come now to some criticism of particular words, as written by Bekker with or without digamma. All the words which have been generally agreed upon as showing evidence of this initial, receive it here. The list of digammated words given in my Grammar (23 D) was not designed to be complete, but only to include the most important roots in which traces of the consonant-initial have been generally recognized. It contains about 33 distinct roots, and in all these without exception Bekker has admitted the digamma. Beside these he admits it in some 20 or 30 more, for I have not been able yet to make out an exact list. In many of these additional words, the real existence of the digamma is beyond all reasonable doubt. This is true, for instance, of $\xi\tau\omicron\varsigma$ *year*, which connects itself naturally with Sk. *vatsara*, year, Lat. *vetus*, old (i. e. full of years, *annosus*). Out of 19 Homeric passages which show the word, only two resist the introduction of the consonant, and these allow it if we only re-insert an elided vowel: thus $\tau\omicron\sigma\sigma\alpha\tilde{\upsilon}\tau' \xi\tau\epsilon\alpha$ (B, 328) may be changed to $\tau\omicron\sigma\sigma\alpha\tilde{\upsilon}\tau\alpha \phi\acute{\epsilon}\tau\epsilon\alpha$, $\pi\acute{o}\lambda\lambda' \xi\tau\epsilon\alpha$ (Υ, 255) to $\pi\acute{o}\lambda\lambda\alpha \phi\acute{\epsilon}\tau\epsilon\alpha$, the last two vowels of $\phi\acute{\epsilon}\tau\epsilon\alpha$ being taken as one syllable by a frequent synizesis. But, as might have been expected, there are words written by Bekker with digamma in which there is room for

doubt and for difference of opinion. A striking instance of this kind is found in the word *ἔλωρ* *prey*, which occurs 8 times, with the connected *ἔλωρα* and *ἐλώρια*, each of which occurs once (the last in *A*, 4). In 3 of these 10 passages (*P*, 667, *A*, 4, *E*, 684) there is a hiatus before the word, but it is at the feminine caesura of the third foot, where hiatus has scarcely any weight in proving an initial consonant. In 5 passages (*E*, 488, *P*, 151, *γ*, 271, *ε*, 473, *ω*, 292), a *ν* movable precedes, which neither hinders us from assuming digamma, nor furnishes any proof of its existence. The remaining two passages give evidence of an initial vowel. In one, *Πατρόκλοιο δ' ἔλωρα* (*Σ*, 93), the *ε* of *δέ* is elided before *ἔλωρα*: in the other, *μή πώς μοι ἔλωρ* (*ν*, 208), the diphthong of *μοι* is made short. In the first case, Bekker gets rid of the difficulty by reading *Πατρόκλου δὲ ἔλωρα*: in the second, he yields to the difficulty, and writes *ἔλωρ* without digamma. We cannot here lay much stress on the proportion (20 per cent) of unconformable passages, the whole number being so small. But as digamma is not required in any single passage of the 10, and is excluded by 2, it is certainly hazardous to assume it without other proof of its existence. Such proof one might perhaps find in its derivation. It is natural to take it from the root which appears in the second aorist of *αἰρέω*, infin. *ἐλεῖν*, indic. *εἶλον*, where the augment affords evidence of an original consonant initial. If *εἶλον* is for *εφελον*, *ἐλεῖν* for *φελειν*, we might connect them with Latin *vello*, to pluck. But the 2d aor. of *αἰρέω* is never written with digamma by Bekker, and it is quite clear that it was not digammated in the Homeric language. It furnishes therefore a very feeble presumption for the digamma of the substantives; and we cannot but conclude that it would have been the safer and wiser course to leave the substantives also without digamma.

Another word in which we must question the propriety of the digamma that Bekker gives it, is the deponent verb *ἐρύομαι* to *watch*, *guard*, *preserve*. This verb in many of its forms is apparently identical with *ἐρύω* to *draw*; and it has been assumed almost universally that they come from the same root. Buttmann in his *Lexilogus* argues the question at length, maintaining their essential identity. Apart from the indications of a digamma, there are other reasons for separating the two verbs. Thus, as to form, *ἐρύω* to *draw* shows *ει* only where it would arise from augment or reduplication; while *ἐρύομαι* to *guard* shows *ειρύσονται* in the future, *ειρύσασθαι* in the aorist infinitive, and other like forms. Again, *ἐρύομαι* to *guard* is sometimes inflected according to the *μι*-form, as in *ἔρυντο*, *εἔρυντο*, etc., which is never the case with *ἐρύω* to *draw*. And yet again, with *ἐρύομαι* to *guard*, there is a verb *ῥύομαι*, with initial *ρ*, which has the same mean-

ing: with *ἐρύω to draw*, there is no such side-form. Of these points of difference, Buttmann does not notice the first two: as to the last, he says with much force that the substantive *ἐντήρ pole of a wagon* (drawer) gives proof of a verb *ἐρύω = ἐρύω to draw*. If we turn from the form to consider the meaning of these verbs, we find something of a step from *drawing* to *watching*. Buttmann, however, bridges over the gulf: from *drawing to oneself* (the proper sense of the middle form) comes the idea of *rescuing*; from *rescuing* that of *guarding*; from *guarding* that of *watching* and even of *watching against*. The development is certainly possible, and if it stopped at the point of *rescuing*, we might regard it as probable: but from *rescuing* to *watching against*, *watching to injure*, there is still a long journey, which we cannot assume without hesitation. But these reasons for separating the words gain almost irresistible confirmation from a circumstance which Buttmann has not noticed, viz., that the indications of the Homeric verse show very clearly that *ἐρύω to draw* began with a consonant, and almost as clearly that *ἐρύομαι to guard* began with a vowel. I have collected the Homeric passages which show middle forms of *ἐρύω to draw*: I find 60 in all, many of which give strong proof of an initial consonant, while only 3 (i. e., 5 per cent of the whole number) oppose its introduction. Of the deponent *ἐρύομαι* I find 43 instances in all, among which 23, or more than half, resist the introduction of a digamma. Forms which begin with *ε* followed by *ρρ* I of course do not reckon, as they obviously belong to *ἐρύομαι*, not *ἐρύομαι*. It might be said, however, that some forms in which *ε* is followed by single *ρ*, such as *ἔρυντο was guarding*, *ἐρύσσατο guarded*, could also be taken from *ἐρύομαι*, the *ρ* being left single after the augment, as often happens in the aorist of *ῥέζω to do*. Assuming this, we shall have in all 29 instances of *ἐρύομαι*, of which 12, or more than 40 per cent, will resist the introduction of digamma. Again, it might be said that such a form as *εἰρύσσατο* is to be explained from *εφερυσσατο*, by omission of digamma and contraction of the vowels, so that we could not expect to see in *εἰρύσσατο* the digamma which belongs to the verb-root. If we admit the justice of this reasoning, we shall still further reduce the number of instances to be considered, bringing them down to 19, of which, however, 9, or nearly half, will still oppose the digamma. It is possible that two or three of the cases which I have regarded as middle forms of *ἐρύω*, might be assigned to *ἐρύομαι* in the sense of *rescuing*; but if we should transfer them accordingly, this would not materially affect the numerical relations just exhibited. Observe then that in the middle of *ἐρύω* only one-twentieth of the instances resist the insertion of digamma, while in

ἐρύομαι to guard nearly or quite half of them resist it. This is a very great difference, and cannot possibly be imputed to accident. I hold, therefore, that Ahrens is fully justified in separating the two words as he has done in his Grammar of 1852: and I regard as highly probable his conjecture that ἐρύομαι began originally with σ (compare the Greek & conjunctive, which was originally σα), and that it is connected with Latin *servo*. The primitive sense may have been that of *watching* which we see in the compound *observo*, and from which we readily derive the ideas of *guarding* and *preserving*. But whether it once began with σ or not, we must in any case disapprove the procedure of Bekker in writing it, wherever he can, with digamma. There are in fact only 4 places out of more than 40 which give any sign of an initial consonant. Two of these are in the 23d book of the Odyssey (82, 229), which has in it much that is peculiar, while the others are in a line that occurs twice (ι, 194, κ, 444):

αὐτοῦ παρ νηῖ τε μένειν καὶ νῆα ἔρυσθαι.

This shows another metrical irregularity, the short ι of νηῖ being used for a long syllable. Apparently it is only a variation of the perfectly regular verse:

αὐτοῦ παρ νήεσσι μένειν καὶ νῆας ἔρυσθαι (ξ, 260, ρ, 429).

the two plurals being changed to singulars, with little regard to metrical exactness.

In speaking of ἐρύομαι, I have touched incidentally upon the question whether digamma should be prefixed to the augmented forms of digammate verbs. Wherever the augment makes a syllable by itself, Bekker, no doubt with correctness, writes the digamma after it: thus ἐφάγη was broken from φάγνυμι, ἐφάλη was pressed from φέλω, ἔφειπον I said, tense-stem φειπ from φεφεπ. But when the augment coalesces with the root in the same syllable, he places digamma at the beginning, and of course before the augment: thus he writes φεῖδον I saw, originally εφιδον, φήνασσε was ruling, originally εφανασσε, φήνδανε was pleasing, originally εφανδανε. Now the temporal augment of ἦνασσε must either have come from a stem which had already lost the digamma; or it must have arisen from a stem with digamma by dropping that consonant between ε and α with contraction of these vowels. In either case the augmented form should be without digamma, which could only appear by what must be regarded as an improbable transposition: εφανασσε, φεανασσε, φήνασσε; εφιδον, φεῖδον, φεῖδον. It is at any rate a transposition which we should not accept without clear indications in the Homeric verse. I must own that I have not looked up the evidence myself on this point. But a writer in Jahn's Jahr-

bücher (lxxxix, 681), Heinrich Rumpf, professes to have done so. He says at least that he has looked at all the 2d aorist forms of the root $\iota\delta$ which by the augment begin with $\epsilon\iota$, also at the forms of $\acute{\alpha}\nu\acute{\alpha}\sigma\sigma\omega$, $\acute{\alpha}\nu\delta\acute{\alpha}\nu\omega$, and $\acute{\alpha}\gamma\gamma\upsilon\mu\iota$, which by the augment begin with η . The number of these, taken together, would be about 60, and there are 6 of them (Ψ , 392, γ , 305, ι , 182, κ , 373, λ , 162, τ , 539) which resist an initial digamma. The proportion here is not decisive. But it is more important that he finds not a single case which requires digamma, and only one which on Bekker's principles can be regarded as yielding it any particular support. We must conclude then that there is no sufficient warrant for Bekker's writing of these forms.

In this connection I may speak of the form $\eta\iota\kappa\tau\omicron$, a pluperfect middle of the stem $\iota\kappa$ or $\epsilon\iota\kappa$. It occurs four times in the Odyssey in the expression, $\delta\acute{\epsilon}\mu\alpha\varsigma\ \delta'\ \eta\iota\kappa\tau\omicron\ \gamma\upsilon\nu\alpha\iota\kappa\iota$, which does not allow an initial digamma. " $H\iota\kappa\tau\omicron$ " is most naturally explained as being equivalent to $\epsilon\phi\epsilon\phi\iota\kappa\tau\omicron$, the first ϵ being the augment of the pluperfect, which after the loss of digamma is contracted with the ϵ of the reduplication: $\epsilon\phi\epsilon\phi\iota\kappa\tau\omicron$, $\epsilon\epsilon\iota\kappa\tau\omicron$, $\eta\iota\kappa\tau\omicron$, like $\epsilon\phi\alpha\nu\alpha\sigma\sigma\epsilon$, $\epsilon\alpha\nu\alpha\sigma\sigma\epsilon$, $\eta\nu\alpha\sigma\sigma\epsilon$. Now it is remarkable that the form $\epsilon\iota\kappa\tau\omicron$, with ϵ instead of η , occurs once, in Ψ , 108,— $\kappa\alpha\iota\ \mu\omicron\iota\ \epsilon\kappa\alpha\sigma\tau'\ \epsilon\pi\acute{\epsilon}\tau\epsilon\lambda\lambda\epsilon\nu\ \cdot\ \epsilon\iota\kappa\tau\omicron\ \delta\acute{\epsilon}\ \theta\acute{\epsilon}\sigma\kappa\epsilon\lambda\omicron\nu\ \alpha\upsilon\tau\tilde{\omega}$. This form is naturally explained as being for $\phi\epsilon\phi\iota\kappa\tau\omicron$, with the reduplication, but without the augment, of the pluperfect. It will be seen that the passage allows, though it does not require, an initial digamma. Bekker writes it without; in our judgment he should have inserted it: thus, $\kappa\alpha\iota\ \mu\omicron\iota\ \epsilon\kappa\alpha\sigma\tau'\ \epsilon\pi\acute{\epsilon}\tau\epsilon\lambda\lambda\epsilon\ \cdot\ \phi\acute{\epsilon}\phi\iota\kappa\tau\omicron\ \delta\acute{\epsilon}\ \theta\acute{\epsilon}\sigma\kappa\epsilon\lambda\omicron\nu\ \alpha\upsilon\tau\tilde{\omega}$.

If we have complained of Bekker for prefixing digamma to the augmented forms of digammate verbs, we have to complain of him for omitting digamma in some instances from their reduplicated forms. The word just mentioned, in which he writes $\epsilon\phi\iota\kappa\tau\omicron$, not $\phi\acute{\epsilon}\phi\iota\kappa\tau\omicron$, is a case in point. Another is seen in χ , 348:

$\pi\alpha\nu\tau\omicron\iota\alpha\varsigma\ \acute{\epsilon}\nu\acute{\epsilon}\phi\upsilon\sigma\epsilon\nu\ \cdot\ \epsilon\phi\omicron\iota\kappa\alpha\ \delta\acute{\epsilon}\ \tau\omicron\iota\ \pi\alpha\rho\alpha\epsilon\acute{\iota}\delta\epsilon\iota\nu.$

On first looking at this, I thought that perhaps the pause (colon) before $\epsilon\phi\omicron\iota\kappa\alpha$ might have had something to do with Bekker's retention of the preceding ν movable. But I found afterwards a passage (I , 70), which in this respect is exactly similar, but is differently treated by Bekker:

$\delta\alpha\acute{\iota}\nu\upsilon\ \delta\alpha\acute{\iota}\tau\alpha\ \gamma\acute{\epsilon}\rho\omicron\nu\sigma\iota\ \cdot\ \phi\acute{\epsilon}\phi\omicron\iota\kappa\acute{\epsilon}\ \tau\omicron\iota,\ \omicron\tilde{\upsilon}\ \tau\omicron\iota\ \acute{\alpha}\phi\epsilon\iota\kappa\acute{\epsilon}\varsigma.$

This inconsistency, I suspect, must be the result of inadvertence. In all other cases, so far as I have observed, Bekker writes the perfect and pluperfect active of this verb with digamma where the verse allows it. The number of instances is very large, 125, if I have

counted right, and the unconformable cases only 10, or about 8 per cent. The perfect of ἀνδάνω (root φαδ) occurs but twice (I, 173, σ, 422). Bekker both times writes πᾶσιν ἐφάδοτα. We hold that he should have written πᾶσι φεφάδοτα: the presumption is that the digamma was regularly repeated in the reduplication, as Bekker gives it in φέφοικα. The perfect middle of εἰλω (root φελ) occurs four times, twice after ν movable, and twice after a hiatus, which however is at the feminine caesura of the third foot. Bekker everywhere writes ἐφέλμεθα, ἐφέλμενος: we hold, as before, that he should have written φεφέλμεθα, φεφέλμενος. The next case to be considered—that of ἔλπομαι (root φελπ) to hope—is attended with more difficulty. The perfect ἔολπα and pluperfect ἐώλπειν occur twelve times in all: 3 times with hiatus, 4 times with ν movable before them: therefore 7 times where digamma is admissible; leaving 5 cases which resist it. This large proportion of unconformable cases might make us doubt whether we ought to recognize digamma at all in these forms. But the φ of the root is unquestionable, and gives a strong presumption for φ in the reduplication. And besides, the three cases of hiatus occur in a part of the verse (at fem. caes. of 2d foot) where hiatus is inadmissible. We hold therefore that there is sufficient evidence of Homeric φέφολπα and φεφώλπειν (or φεφόλπειν), and that these forms should have been given, according to Bekker's principle, wherever the verse allows them. He has in fact given them only in the 3 cases of hiatus, while in the 4 of ν movable he retains that letter and writes ἔφολπα, ἐφώλπειν; thus contravening both his general method and his procedure in the parallel case of ἔοικα, ἐώκειν. In ἔοργα, ἐώργειν, we find very much the same state of things—12 passages in all, of which 5 resist digamma. The ν movable, however, occurs here in only one case (ξ, 289):

τρώκτης, ὃς δὴ πολλὰ κάκ' ἀνθρώποισιν ἐώργει.

Here, from the analogy of his procedure in reference to ἐώλπειν, we may presume that Bekker would have written ἀνθρώποισιν ἐφώργειν, if he had not followed Voss in making a greater change, altering the dative to an accusative in accordance with the usual construction of the verb, making ἀνθρώπους εἰφώργειν. It might be questioned, however, whether we ought not in this case to have ἡφώργειν for εφεφοργειν, in the same manner as ἡφικτο for εφεφικτο. In the perfect middle of ἔργω (root φεργ) to shut, we find a different state of things. Here we have ἔρχαται and ἔρχατο occurring 7 times. They are evidently forms without reduplication, like οἶδα I know (i. e. φοῖδα, not φεφοῖδα), εἶμαι am clothed (i. e. φεσμαι, not φεφεσμαι), and in stems beginning with other letters, δέχαται have received (for δεδέχαται), ἄνωγα I command (for ἡνωγα). Hence, when we find ἐεργμέναι and ἐέρχατο occurring each

of them once, we must presume that the first ϵ is not part of a reduplication, but the same common prefix which we find, for instance, in $\epsilon\acute{\epsilon}\lambda\delta\omicron\mu\alpha\iota$ (i. e. $\epsilon\phi\epsilon\lambda\delta\omicron\mu\alpha\iota$) for $\phi\acute{\epsilon}\lambda\delta\omicron\mu\alpha\iota$ *to wish*, and the aorist participle $\epsilon\epsilon\iota\sigma\acute{\alpha}\mu\epsilon\nu\omicron\varsigma$ (i. e. $\epsilon\phi\epsilon\iota\sigma\alpha\mu\epsilon\nu\omicron\varsigma$) *having likened oneself*. We shall not then be surprised to see that $\epsilon\phi\epsilon\rho\gamma\mu\acute{\epsilon}\nu\alpha\iota$ and $\epsilon\phi\acute{\epsilon}\rho\chi\alpha\tau\omicron$ do not admit initial digamma.

We come now to consider the question, whether our editor does right in recognizing only one lost consonant, the digamma, or whether he should not have recognized others as producing similar appearances in the Homeric verse. Curtius, in the concluding part of his *Principles of Greek Etymology*, maintains in the case of several words, that the epic hiatus was occasioned by a consonant y -sound. He holds this to be true in reference to $\epsilon\omicron\iota\kappa\alpha$, $\epsilon\acute{\omega}\kappa\epsilon\iota\nu$, which we have just considered. He remarks that dialects and inscriptions give no evidence of digamma in this word; that no root vik in the sense of *likeness* is to be found in the cognate languages; and that it is therefore very hazardous to write $\phi\acute{\epsilon}\phi\omicron\iota\kappa\alpha$, $\phi\epsilon\phi\acute{\omega}\kappa\epsilon\iota\nu$, in the text of Homer. He observes that there are clear traces in Herodotus and elsewhere of a word $\delta\epsilon\iota\kappa\eta\lambda\omicron\varsigma$ or $\delta\epsilon\iota\kappa\epsilon\lambda\omicron\varsigma$ having the sense of $(\epsilon)\acute{\iota}\kappa\epsilon\lambda\omicron\varsigma$ *like, similar*. He is therefore led to adopt the conjecture of Bopp, that the root of $\epsilon\omicron\iota\kappa\alpha$ is formed from that of $\delta\epsilon\iota\kappa\nu\nu\mu\iota$, Lat. *dico*, Sk. *diç* (i. e. *dik*), *to show*. He conceives that the δ assumed a parasitic y , and then dropped away itself, thus *dik*, *dyik*, *yik*, and that from *yik* thus formed came by reduplication $y\epsilon y\omicron\iota\kappa\alpha$, $y\epsilon y\acute{\omega}\kappa\epsilon\iota\nu$. I cannot think that there is much plausibility in this explanation. If the transition from *dik* to *yik* was made in the formative Indo-European period, we might expect to find a root *yik* having the sense of *likeness* somewhere in the cognate languages, which Curtius does not pretend is the fact. It is evident indeed that he regards the evolution of *yik* from *dik* as taking place in the Greek after the Indo-European time. We must think then of the root *dik* as already provided with inflection, making a reduplicated preterite $\delta\epsilon\delta\omicron\iota\kappa\alpha$, from which would come first, by adding y to both δ 's, $\delta y\epsilon\delta y\omicron\iota\kappa\alpha$, and then, by dropping both the δ 's, $y\epsilon y\omicron\iota\kappa\alpha$. But the change from δ to y is confessedly a rare one in the Greek language: how hazardous then to assume that it has occurred twice in the same form. It might perhaps be said that the change occurred first in some such form as $\delta\iota\kappa\epsilon\lambda\omicron\varsigma$, meaning *like*, which passed into $y\iota\kappa\epsilon\lambda\omicron\varsigma$; that this gave the suggestion of a root $y\iota\kappa$, meaning *to be like*, and that $y\epsilon y\omicron\iota\kappa\alpha$ was formed independently from this suggested root, and not by phonetic change from a pre-existing $\delta\epsilon\delta\omicron\iota\kappa\alpha$. This is indeed possible: but we should scarcely expect that a root arising at this comparatively late stage of linguistic development

would take the more primitive formation seen in *ῥοικα*, with its interchange of *ικ*, *εικ*, *οικ*. For such reasons the rise of *ῥοικα* from a root *dik* seems to me scarcely more than a possibility. It must be observed too that unless the connection of *ῥοικα* with a root *dik* is rendered probable, there is no more reason for writing it with *y* than with *ϕ*. And if *no more* reason, we may justly say that there is *less* reason for *y* than for *ϕ*. Because the very regularity with which this word in the Homeric text gives evidence of a consonant initial, is a circumstance in favor of *ϕ*. In this respect it ranks, as we have seen, among the most regular words, the unconformable cases being only 10 in 126, or about 8 per cent. If we consider how much earlier and more complete was the disappearance of *y* from the language when compared with that of *ϕ*, we shall be slow to believe that the former should maintain itself in the Homeric verse with the same constancy as the latter.

Another case in which Curtius recognizes traces of an initial *y* in Homer, is the deponent *ἔπειμι* *to be eager, to desire, to long*. It occurs in 61 instances, of which 22 by hiatus give evidence of a consonant initial, and the unconformable cases are only 3, or about 5 per cent. Bekker writes it with digamma. To this Curtius objects, asserting that the verb *ἔπειμι* is a reduplicated form of the root *yâ*, which appears in Sanskrit, and is itself an extended form of the root *i*, to go. Thus *ἔπειμι* = *yî-yâ-mi*, to cause to go, to send. In the middle this would mean *to send oneself*, and hence *to hasten, to pursue eagerly, to aim at, to long for*. To this no objection can be made as regards the meaning. But it is a remarkable circumstance that *ἔπειμι* *to send* shows no traces in Homer of anything but a vowel initial. Of simple forms in the present and imperfect—these I take for comparison because *ἔπειμι* *to desire* is confined to those tenses—I find in the sense of *sending* 29 (all active except *ἔπειμι*, 77, *ἔπειμι*, 274, *ἔπειμι*, 304, which show the middle or passive); and of this 29, not less than 24, or more than 80 per cent, refuse to admit a consonant initial. Compound forms, such as *ἀφ᾽ ἔπειμι*, *μεθ᾽ ἔπειμι*, etc., I have not taken into the account: I believe, however, that all of them which are capable of furnishing any evidence on the point, testify against a consonant initial for the simple verb. It may be regarded as perfectly certain that *ἔπειμι* *to send* was sounded by Homer with an initial vowel, and *ἔπειμι* *to desire* with an initial consonant. We have here a distinction of the same kind as that which we before proved to exist between *ἔρρω* *to draw* and *ἔρρωμι* *to guard*. Now it might be said by one who maintained the original identity of *ἔπειμι* *to send* and *ἔπειμι* *to desire*, that the *y*, which once belonged to both alike, was retained, and that with uniformity, in the

sense of *desiring*, after it had been lost, and that with uniformity, in the sense of *sending*. That this is a possibility we admit, but it is nothing more. The probability is that the two words are radically distinct; and if so, then for the same reason as before, the Φ has more in its favor than the γ . The fact that later dialects furnish no support to it is of little significance, as the deponent $\lambda\epsilon\mu\alpha\iota$ belongs only to the early language.

The remaining case in which Curtius recognizes initial γ as exercising the power of a consonant in the Homeric verse, is the relative stem, which appears in $\delta\varsigma$, η , θ , $\omega\varsigma$, $\sigma\iota\sigma$, $\delta\sigma\sigma$, $\delta\pi\omega\varsigma$, $\delta\pi\sigma\iota\sigma$, $\delta\phi\sigma\sigma$, $\eta\mu\sigma\varsigma$, $\iota\sigma\alpha$, $\epsilon\omega\varsigma$, etc. Savelsberg, in the eighth volume of Kuhn's *Zeitschrift*, has given a series of citations from Homer, showing traces of an initial consonant for this class of words. Unfortunately he has not furnished exact numerical data, by which we might see the comparative frequency or infrequency of the phenomenon. I have not myself had time to supply the deficiency. I have only run hastily through the first book of the *Iliad*, noting all words which show the relative stem—omitting, however, the relative adverb $\omega\varsigma$, which in this respect stands by itself. The whole number of instances noted was 72, of which 30, or about 42 per cent, testify against a consonant initial. Of the remaining instances, many were found at the beginning of a line, or in other indecisive positions; and in fact there are only 8, or one-ninth of the whole number, which give any indication of a consonant initial. Even of these, the majority, either from the part of the verse which they occupy, or from the pause which precedes them, are of but little weight: only 2 or 3 give decided indications of an initial consonant. I strongly suspect that a more extended comparison would not essentially change the proportions derived from this first book. They seem barely sufficient to give plausibility to the conjecture that the relative stem did once begin with a consonant, but had nearly or quite lost it in the Homeric time. I say, “nearly or quite:” for if the letter had wholly died out from common use shortly before Homer's time, the force of epic tradition would probably have caused some traces of it still to appear in his verse. But the adverb $\omega\varsigma$ differs in this respect very remarkably from the other forms of the relative stem. According to Bekker, as cited by Curtius, the instances which indicate a consonant initial are three times more numerous than those which indicate a vowel initial. It can hardly be doubted that this word, as pronounced in the Homeric time, began frequently, if not generally, with a consonant.

It must be owned that our condition as regards the etymology of the Greek relative, is an unsatisfactory one. We are less confident and

comfortable than we were ten years ago. Then we had no hesitation about connecting it with the Sk. *yas*, *yâ*, *yat*, assuming a change of *y* to the rough breathing, as in ἥπαρ (i. e. ἥπαρι) *liver*, Sk. *yakṛt* (i. e. *yakart*). But now, if we do not surrender this conviction, our faith in it has become less full and sure. A Locrian inscription, published by L. Ross in 1854, presents the form *FOTI*, with digamma, for *δτι*. A digammated form of the relative stem is also seen in a gloss of Hesychius, quoted by Savelsberg: Βαλικιώτης, συνέφηβος, Κρητες, i. e. for “youthful companion” the Cretans use βαλικιώτης (i. e. φαλικιώτης, equivalent to ἡλικιώτης). To these testimonies, Savelsberg, in the article referred to, adds the indications of digamma in the Homeric verse, and concludes that the Greek relative was *φός*, *φή*, *φό*, or *φός*, *φᾶ*’, *φόν*. These he supposes to have been later forms of **φος*, **φᾶ*, **φον*, Latin *qui*, *quae*, *quod*. He thus identifies again the Greek and Latin relatives, though in a very different way from that of the old-fashioned etymology, which held that the original *h* of the Greek relative was in Latin hardened to a *k*-sound (*qu*). The omission of the *k*-sound in the Greek *φός* would be something like that in the Latin *ubi*, *unde*, for *cubi*, *cunde*, which remain in the compounds *sicubi*, *alicunde*. The stem *kva*, which would thus underlie the relatives of these two languages, Savelsberg supposes to have been developed out of *ka*, the stem of the Sanskrit interrogative. He goes yet further, and from the same origin derives even the Sanskrit relative: *ya*, he thinks, is for *kya*, and *kya* like *kva* is only an altered form of *ka*. But Schleicher and Curtius are not yet prepared to admit that the Greek relative-stem began with digamma, still less that it was ever *kva*. The former touches on the subject in his *Compendium of Comparative Grammar*, p. 180: the latter more at length in his *Principles of Greek Etymology*, ii, 177–8. In respect to the *FOTI* of the Locrian inscription, they say that when the digamma-sound had nearly vanished from the Greek dialects, its sign was sometimes used improperly by scribes or grammarians for other spirants, and especially for the *y*, which had no sign of its own even in the earliest Greek alphabet; and they appeal to a Corcyraean inscription, which shows a genitive singular masculine of the first declension in *-AFO*, where all analogy would lead us to expect *-ayo* or *-ahyo*, Sk. *asya*. As regards the Homeric usage, they say that the phenomena which seem to indicate digamma, could equally well be produced by *y*. In this there is no intrinsic improbability, though one would be glad to have the support of some parallel case which we could look upon as clear and certain. The parallels which Curtius brings forward are the verb *ἔμαι* to *aim at*, *desire*, and the root

of *ῥοιχα*; neither of which, as we have seen, is much to be relied on. As to the derivation of a relative *ῥος* from **ῥος* by omission of ***, Curtius remarks that "the only phonetic analogy which could be called in to support it, is that of the High German *wer* (for *hwer*) = Gothic *hvas*, cf. Eng. *what*. But the loss of the feeble *h* proves little for that of *k*; and how improbable that of the two consonants the Greek would give up the perfectly familiar *** in favor of the unstable digamma, wavering even from the earliest time." [It may be observed in passing, that Curtius' own derivation of *ῥοιχα* from *dik*, *dyik*, *yik*, is liable to the same objection: it makes the Greek give up the familiar *δ* in favor of the unstable and perishing *y*.] "Still less," he continues, "can it be proved that Sk. *yas* has come from *kyas*, and that *ka* with the secondary *kva*, *kya*, is the common root of all these widely ramified pronouns. Finally, the demonstrative meaning of the Greek *ὅς* in *καὶ ὅς ἐφη* speaks against this derivation, and recommends the assumption that the originally demonstrative stem *i*, with the secondary form *ya*, lies at the basis of the Greek relative." As the demonstrative use in *καὶ ὅς ἐφη* is confined to the nominative, while in the accusative we have *καὶ τόν*, it seems to me quite possible that the *ὅς* is for *ὁ*, by confusion of the two forms *ὅς* and *ὁ*, so much alike in appearance, though so diverse in origin. Curtius then adds, as Schleicher also does, that if the Greek relative did really begin with *ῥ*, it would be preferable to explain it from a stem *sua*, which appears with relative force in Gothic *sve*, *as*, whence the German *so* in its relative use. This relative stem *sua* was long ago recognized in Greek by Curtius himself (Kuhn's *Zeitschrift*, iii, 75, 76), though only in the merest relic, the adverb *ῥή as*, which the Alexandrine critic Zenodotus read in two passages of the *Iliad* (*B*, 144, *Ξ*, 499). Lottner afterwards, in Kuhn's *Zeitschrift*, ix, 320, proposed to derive all the forms of the Greek relative from this same stem. But the traces of a digamma in the Greek relative are much less frequent and decided than we should naturally expect to find them if this were its real derivation—much less so than in the forms of the possessive *ὅς*, *ῥή*, *ὅν*, *his*, *her*, *its*, which come from a stem of the same sound *sua*, though of widely different import. Possibly the fact which we have noticed, that the adverb *ὥς* differs so much from the other forms of the relative in the indications which it shows of a consonant initial, may warrant the conjecture that they are of different origin, that in fact *ὥς* came from the digammate stem *sua*, while *ὅς*, *ὁῖος*, *ὁσος*, and the rest, are akin to the Sanskrit *yas*, *yâ*, *yat*, and came from a stem with initial *y*-sound.

Ahrens, in Kuhn's *Zeitschrift*, x, 65 ff., has sought to show that appearances in the Homeric verse similar to those produced by digamma are in some instances to be ascribed to a lost sigma. An instance of this kind—in which, however, the initial σ is not lost but retained in the written text—is presented by the word $\tilde{\upsilon}\varsigma$ *hog*. The simple form of this word appears in 55 passages with initial σ , as $\sigma\tilde{\upsilon}\varsigma$, $\sigma\upsilon\acute{\omicron}\varsigma$, etc. It occurs also in 21 passages where an initial consonant would be incompatible with the metre, and in all these places the σ is dropped: we have $\tilde{\upsilon}\varsigma$, $\acute{\omicron}\acute{\omicron}\varsigma$, etc. In the later language both forms of this word were in use, though the one with consonant initial was comparatively rare. If when the poems were reduced to writing the form with σ had been wholly lost from use, it is probable that our written text would have shown $\tilde{\upsilon}\varsigma$ only, with initial vowel, in all the 76 passages, though in many of them the metre would have shown traces of a lost consonant. And it is quite conceivable that in other words this may actually have been the case. Such an occurrence Ahrens recognizes with no little plausibility in the words $\tilde{\upsilon}\lambda\eta$ *wood*, $\acute{\omicron}\acute{\omicron}\varsigma$ possessive, and $\acute{\epsilon}\kappa\alpha\sigma\tau\omicron\varsigma$ *each*. In regard to $\tilde{\upsilon}\lambda\eta$, Lat. *silva*, it is certain that it began originally with σ , and equally certain that in Homer's language it usually began with a vowel. But there are two cases of a remarkable hiatus before the word ($\sigma\epsilon\lambda\epsilon\tau\omicron$ $\tilde{\upsilon}\lambda\eta$, Ξ , 285, and $\acute{\epsilon}\pi\epsilon\chi\epsilon\upsilon\alpha\tau\omicron$ $\tilde{\upsilon}\lambda\eta\nu$, ϵ , 257, where $\tilde{\upsilon}\lambda\eta$ in each forms the sixth foot), which seem to show that the initial σ was not wholly forgotten in the Homeric time. The possessive $\acute{\omicron}\acute{\omicron}\varsigma$, in its relation to $\acute{\omicron}\varsigma$, is explained by Ahrens in a way which has been quite generally received as probable. He assumes in the earlier period two forms, a fuller $\sigma\epsilon\phi\acute{\omicron}\varsigma$, and a shorter $\sigma\phi\acute{\omicron}\varsigma$: from $\sigma\epsilon\phi\acute{\omicron}\varsigma$ came regularly the $\acute{\omicron}\acute{\omicron}\varsigma$, from $\sigma\phi\acute{\omicron}\varsigma$ the $\acute{\omicron}\varsigma$, of our common text. This explanation is supported by the analogy of the possessive forms $\tau\epsilon\acute{\omicron}\varsigma$ and $\sigma\acute{\omicron}\varsigma$ for the second person; of which, in all probability, $\tau\epsilon\acute{\omicron}\varsigma$ is for $\tau\epsilon\phi\acute{\omicron}\varsigma$, and $\sigma\acute{\omicron}\varsigma$ for $\tau\phi\acute{\omicron}\varsigma$. Now in 92 instances of the pronoun $\acute{\omicron}\acute{\omicron}\varsigma$, there are 52 which do not allow an initial consonant, and it is therefore certain that in the Homeric time it generally began with a vowel. But there are 4 instances ($\mathcal{A}$, 533, I , 420, 687, θ , 524) of remarkable hiatus in the first foot, after the first short of a dactyl ($Z\epsilon\upsilon\varsigma$ $\delta\grave{\epsilon}$ $\acute{\omicron}\acute{\omicron}\nu$. $\chi\epsilon\iota\rho\alpha$ $\acute{\epsilon}\eta\nu$. $\acute{\omicron}\varsigma\tau\epsilon$ $\acute{\epsilon}\tilde{\eta}\varsigma$.), which seem to present traces of the primitive initial σ . And moreover this word makes hiatus 14 times in the feminine caesura. We have seen that hiatus is readily allowed in that place; but its relative frequency is so great in the case of this word (three times greater than in the analogous case of $\acute{\epsilon}\mu\acute{\omicron}\varsigma$ *my*) as to warrant the suspicion that it arises from a peculiar cause, and is connected with the primitive initial σ . Bekker writes the pronoun, wherever he can, with initial ϕ : he appears to suppose

that from $\text{F}\acute{\omicron}\varsigma$ came $\epsilon\text{F}\acute{\omicron}\varsigma$ by a prefixed ϵ , and then, by transposition of digamma, $\text{F}\epsilon\acute{\omicron}\varsigma$. But such a transposition is a more hazardous assumption than he seems to think; and the form $\text{F}\epsilon\acute{\omicron}\varsigma$ has little support either in the Homeric text, or in the suggestions of comparative philology.

It remains to speak of the pronoun $\epsilon\kappa\alpha\sigma\tau\omicron\varsigma$ *each*, and the kindred adverb $\epsilon\kappa\acute{\alpha}\tau\epsilon\rho\theta\epsilon$ *on each side*: the pronoun $\epsilon\kappa\acute{\alpha}\tau\epsilon\rho\varsigma$ itself is incapable of appearing in the heroic hexameter. The derivation of $\epsilon\kappa\acute{\alpha}\tau\epsilon\rho\varsigma$ and $\epsilon\kappa\alpha\sigma\tau\omicron\varsigma$ is as yet far from certain. It is probable, however, that the $-\kappa\alpha\tau\epsilon\rho\varsigma$ and $-\kappa\alpha\sigma\tau\omicron\varsigma$ are a comparative and superlative form from the interrogative stem $\kappa\alpha$, that they are in fact identical with the interrogatives $\pi\acute{\omicron}\tau\epsilon\rho\varsigma$ and $\pi\acute{\omicron}\sigma\tau\omicron\varsigma$, which in their Ionic forms are $\kappa\acute{\omicron}\tau\epsilon\rho\varsigma$ and $\kappa\acute{\omicron}\sigma\tau\omicron\varsigma$. It is probable also that the first syllable ϵ is the same as in the numeral $\epsilon\kappa\alpha\tau\acute{\omicron}\nu$, Lat. *centum*, Sk. *catam* (i. e. *katam*). If so, it is probably for $\epsilon\nu$, the root of the numeral $\epsilon\acute{\iota}\varsigma$ *one*: thus $\epsilon\kappa\alpha\tau\acute{\omicron}\nu = \text{ONE hundred}$, $\epsilon\kappa\acute{\alpha}\tau\epsilon\rho\varsigma = \text{ONE which-more, one which of two}$. Here now we stumble again upon an uncertainty: but of all the explanations proposed for the numeral $\epsilon\acute{\iota}\varsigma$, $\epsilon\nu$, the most probable is that which connects it with Sk. *sama*, our Eng. *same*, Lat. *semel*, *simplex*, *singuli*. It thus appears that σ may probably have been the primitive initial of $\epsilon\kappa\acute{\alpha}\tau\epsilon\rho\varsigma$, $\epsilon\kappa\alpha\sigma\tau\omicron\varsigma$. We have already observed that, according to Ahrens' enumeration, $\epsilon\kappa\alpha\sigma\tau\omicron\varsigma$ occurs 110 times in the Iliad. Now 66 of these are cases of hiatus, some of them easily admissible, but many others giving strong indication of a consonant initial. It is not therefore surprising that Bekker should have written $\text{F}\epsilon\kappa\alpha\sigma\tau\omicron\varsigma$ and $\text{F}\epsilon\kappa\acute{\alpha}\tau\epsilon\rho\theta\epsilon$ wherever the verse allows it. Out of 28 unconformable cases he makes 17 conformable by various conjectures, several of which belong to the most hazardous that he has ventured. In 11 cases he has left the initial vowel untouched. Here the proportion of unconformable cases, 25 per cent, throws suspicion on the digamma, which is much increased by the fact that comparative philology has no plausible explanation for the forms $\text{F}\epsilon\kappa\acute{\alpha}\tau\epsilon\rho\varsigma$, $\text{F}\epsilon\kappa\alpha\sigma\tau\omicron\varsigma$. Such forms as $\sigma\epsilon\kappa\acute{\alpha}\tau\epsilon\rho\varsigma$ and $\sigma\epsilon\kappa\alpha\sigma\tau\omicron\varsigma$ are much more probable on grounds of comparative philology. Practically then the case as to $\epsilon\kappa\alpha\sigma\tau\omicron\varsigma$ stands in this way. It cannot well be doubted that the word, sometimes at least, began with a consonant in the Homeric language. If we assume that digamma is the only initial consonant of the Homeric language which has failed to appear in our text, then we must recognize a Homeric $\text{F}\epsilon\kappa\alpha\sigma\tau\omicron\varsigma$: such, doubtless, was the reasoning of Bekker. But the assumption is an unsafe one: there is reason for suspecting that other initial consonants of the Homeric language have had, though to a far less extent, the same fortune as digamma; and in

this particular word there is reason for suspecting that it began with some other consonant. Yet we would by no means advise either that the relative-stem should be written in Homer with initial γ , or that $\epsilon\chi\alpha\sigma\tau\omicron\varsigma$ and $\epsilon\acute{o}\varsigma$ should be written with initial σ . A lost digamma manifests itself in the Homeric verse in many words with much clearness and with considerable approach to uniformity: it may therefore with propriety be inserted in an edition having the character and aims of the one under review. But the case is widely different with a lost γ and a lost σ : these, if we make the most of them, are only rare and doubtful.

ART. V.—ON THE MEAN TEMPERATURE, AND ON THE FLUCTUATIONS OF TEMPERATURE, AT NEW HAVEN, CONN., Lat. $41^{\circ} 18' N.$, Long. $72^{\circ} 55' W.$ of Greenwich; BY PROFESSORS ELIAS LOOMIS AND H. A. NEWTON.

IN July, 1862, the Connecticut Academy of Arts and Sciences appointed a committee, consisting of Professors Elias Loomis and H. A. Newton, to reduce the meteorological observations which for a series of years had been made in the name of the Academy, and also to incorporate with them any other reliable observations made in New Haven. The committee have discharged the duty imposed upon them, so far as relates to the observations of temperature, and now present the results of their labors.*

The following is a list of the Meteorological Journals, of which an abstract is here presented.

1. A Register kept by Rev. Ezra Stiles, D.D., President of Yale College. This register extends from the commencement of Dr. Stiles' presidency in June, 1778, until two days before his death, which occurred May 10, 1795. There is an interruption of the Journal from July 4, 1779, to Jan. 22, 1780, caused by the invasion of New Haven by British troops, at which time Pres. Stiles' thermometer was broken. The subsequent observations were made with a thermometer belonging to the college.

This register was kept without much system. Sometimes the number of entries amounts to a dozen or more in a day; frequently there were only one or two entries; and occasionally a day was entirely omitted. President Stiles adhered to no fixed hours of observation; although he generally made an observation at some early hour in the morning; another about the time of greatest heat; and another late in the evening. He was, however, always careful to specify the hour of observation. This irregularity of hours has rendered it very difficult to obtain satisfactory mean results; and in some instances it has been thought best to reduce the observations to certain fixed hours, by applying the corrections contained in the table on page 199. The thermometer employed was made in London, with Fahrenheit's scale, and was attached to the President's house, which was on the west side of College street, a little south of Chapel street.

2. A register kept by Messrs. Isaac Beers and Hezekiah Howe from 1788 to 1791, and from 1796 to 1805.

* It is but just to say that the greater part of the labor has been performed by the chairman of the committee.

These observations were made regularly three times a day, at fixed hours. The thermometer employed was attached to Mr. Beers' bookstore, which was on the corner of Chapel and College streets, on the spot now occupied by the New Haven Hotel. It is supposed that this register originally embraced a longer period than is mentioned above, but these years include all which can now be found.

3. A Register kept by order of the Connecticut Academy of Arts and Sciences. This register has been kept successively by various individuals, upon different plans, and with numerous interruptions.

A. The register from March, 1800, to Feb., 1803, forms a manuscript volume by itself. The observations were made three times a day, at fixed hours. During a part of the year 1801, the observations are in the handwriting of President Day, who was at that time tutor in Yale College. It is not known by whom the other observations were made.

B. The register from Jan., 1804, to Dec., 1820, was kept by Rev. Jeremiah Day, D.D., who was Professor of Mathematics and Natural Philosophy in Yale College from 1803 to 1817; and subsequently for many years President of the College. This register includes observations three times a day, at fixed hours, and substantially the same system of observations was preserved from the beginning to the end of the register. The thermometer employed in these observations was generally placed eight or ten feet from the ground, and was always attached to President Day's house, which was changed several times during this period, but was always within a moderate distance of the college buildings.

C. The register from Jan., 1821, to Nov., 1830, was kept successively by various individuals and with several interruptions.

The observations for 1821 were made by Prof. A. M. Fisher. Those for 1822 were made chiefly by President Day. From Nov., 1822, to May, 1825, the register was kept by Prof. M. R. Dutton, but the interruptions during this period amount to nearly a whole year. From July, 1826, to Nov., 1830, the register was kept by Prof. D. Olmsted, with a loss of about six months from interruptions.

Whenever the observer was changed, the location of the thermometer was also changed, but the locality was always in the neighborhood of the College.

D. From Dec., 1840, to Aug., 1842, the register was kept by Rev. Chester S. Lyman, now Professor in Yale College. The thermometer was attached to Divinity College; during the first year on the fourth story, and the second year on the third story of the building. In the first position its elevation above the level of the sea was about 65 feet, and in the second position about 57 feet. The observations were generally made five or six times a day.

From Aug., 1842, to Nov., 1843, the register was kept by Mr. E. C. Herrick, and the instruments were removed to his house in College street near Grove street, but the observations of the external thermometer were so few as to be of but little value.

From Jan., 1844, to April, 1847, the register was kept by Col. Enos Cutler at No. 90 George street, about 52 feet above tide water. The observations were generally made five times a day.

From April, 1847, to Aug., 1847, the observations were made by Mr. Francis Bradley.

From Aug., 1847, to May, 1849, the register was kept by Col. E. Cutler at No. 2 Wooster street, at an elevation of 30 feet above the sea. From May to July, 1849, the observations were made by Mr. F. Bradley. From July, 1849, to April, 1850, they were made by Col. E. Cutler.

From April to October, 1850, the instruments were kept in the College Library building, where occasional observations were made by Mr. E. C. Herrick.

From Oct., 1850, to May, 1851, the register was resumed by Col. E. Cutler at No. 2 Wooster street. From May to Nov., 1851, the register was interrupted; and it was resumed by Col. E. Cutler from Nov., 1851, to April, 1852, since which time no Journal has been kept in the name of the Academy.

4. The remaining observations were obtained by combining the following miscellaneous registers.

A. A register kept by Mr. E. C. Herrick, late librarian of Yale College. This journal extends from Aug., 1826, to Aug., 1831, embracing observations four times a day. Also from January to July, 1834, four times a day with many interruptions. Also from April, 1837, to April, 1838, generally two or three times a day, and sometimes more frequently. The exact location of the thermometer for these observations is not known; but it was always near the college buildings.

B. A register kept by Rev. Charles Rich from Jan. to Aug., 1838. These observations were made at short intervals, frequently twelve times a day. They were made when Mr. Rich was a Senior in college, and the thermometer was attached to a building on High street near the college. The volume containing these observations was presented to the Connecticut Academy in 1841.

C. A register kept by Hon. Noyes Darling from Dec., 1838, to Nov., 1840, three times a day.

D. A register kept by Mr. Francis Bradley from Dec., 1842, to Oct., 1846. Observations generally twice a day.

E. A register kept by Prof. C. S. Lyman from Jan., 1851, to April, 1852, generally three times a day, and much of the time more frequently.

F. A register kept by Mr. Hawley Olmstead from Dec., 1855, to March, 1858, three times a day.

G. A register kept by Mr. Joseph Bennett for a long series of years. The observations are regularly made three or four, and sometimes five times a day. The observations taken from this record are from April, 1858, to Sept., 1859, and for a part of the years 1864 and 1865.

H. A register kept by Dr. D. C. Leavenworth, commencing Oct., 1859, and continued to April, 1864. The thermometer was exposed on the N.E. side of his store in Chapel street, a few doors east of College street, at an elevation of six feet from the ground, and about forty feet above the sea. This register embraces observations three times a day.

I. A few observations have been taken from a partial register kept by Prof. Elias Loomis, commencing in November, 1861, and continued to the present time.

K. The gaps left by the preceding journals have been filled by extracts from the journal of Dr. Alfred S. Monson. This journal was commenced in 1821, and has been continued to the present time. For the first five or six years the entries were few and irregular, but since that period the entries have been made with great regularity three times a day.

The preceding registers combined extend from July, 1778, to the present time, with interruptions amounting in the aggregate to fifteen months, viz., from July, 1779, to Jan., 1780, and from May to Dec., 1795, making an aggregate of 86 years of observations to September, 1865. These observations have all been reduced as nearly as possible to a uniform system. Whenever the observers adhered to fixed hours of observation, the results here given are the simple averages of the observations with the hours annexed. When the hour of observation was not invariable, an average has been taken of the times of observations, as well as of the temperatures. In a few instances (as in some parts of Pres. Stiles' journal) the hours were so irregular that it has been thought best to reduce the observations to fixed hours, by applying the corrections given in the table on page 199.

In order to be able to reduce observations made at irregular hours, to certain fixed hours, we should know the law of the hourly variation of temperature for each month of the year. This law cannot be certainly known except from hourly observations made at this place. As such observations have never been made, we have endeavored to

obtain all the information which could be derived from hourly observations made at stations nearest to us, and not differing greatly in the character of their climate. The stations chosen for this purpose are Philadelphia on the southwest side of New Haven, and Amherst and Cambridge on the northeast side. The corrections for Philadelphia, as deduced from the Girard College observations, are given by Prof. Guyot in his Meteorological Tables, p. 16. The corrections deduced by Prof. Dove from the observations at Frankford Arsenal are given by Prof. Guyot in his Tables, p. 18. The corrections deduced from observations at Amherst College are given in Guyot's Meteorological Tables, p. 28. The hourly observations at Cambridge were published in the Memoirs of the American Academy, vol. ii, new series, pp. 89 to 134. They extend from Oct. 26, 1841, to Dec. 23, 1842. No reduction of these observations has hitherto been published. The committee have deduced from these observations the following table, showing the mean temperature of each month of the year, at intervals of two hours.

Cambridge Mean temperatures.

Hour.	Jan.	Feb.	March.	April.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
h													
A. M. 0.6	27.92	34.21	33.02	39.41	46.93	54.65	66.00	61.20	49.90	39.66	33.13	29.22	42.94
2.6	27.31	32.94	31.79	39.76	45.67	52.68	64.79	60.35	48.49	38.40	32.77	28.75	41.97
4.6	26.97	32.01	31.48	38.24	45.06	52.60	64.93	59.50	48.17	37.90	32.41	28.66	41.49
6.6	25.71	32.15	30.59	38.93	49.61	59.74	68.24	62.11	47.81	37.75	32.27	28.24	42.76
8.6	23.90	32.54	37.09	43.31	57.04	65.09	73.56	68.00	56.44	43.15	35.37	29.48	47.08
10.6	29.30	36.42	42.41	46.55	60.52	68.95	78.48	71.95	63.45	51.33	41.51	33.85	52.06
P. M. 0.6	33.24	40.40	45.04	48.22	63.08	71.18	79.03	72.72	66.10	55.07	43.66	36.57	54.53
2.6	33.27	40.99	44.51	48.52	63.98	71.49	78.49	73.01	66.04	55.91	43.69	36.33	54.69
4.6	31.76	38.87	42.11	47.01	62.51	69.33	76.64	71.79	63.28	52.28	40.58	33.33	52.46
6.6	29.55	35.13	37.77	44.31	58.13	66.54	72.45	68.39	58.09	45.59	37.62	31.64	48.77
8.6	28.82	34.58	35.24	41.07	52.40	59.60	68.80	64.40	53.82	42.52	35.67	30.58	45.62
10.6	28.13	34.57	33.85	40.21	49.40	56.08	67.00	62.86	51.30	40.82	34.57	29.61	44.03
Mean,	28.82	35.40	37.07	42.96	54.53	62.33	71.53	66.36	56.07	45.03	36.94	31.35	47.37
No. days,	13	10	14	15	14	11	10	11	11	15	30	23	

From this table we have deduced the following showing the

Corrections to be applied to the means of the hours of observation to obtain the true mean temperatures of the months and of the year at Cambridge.

Hour.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
h													
A. M. 0.6	0.90	1.19	4.05	3.55	7.60	7.68	5.53	5.16	6.17	5.37	3.81	2.13	4.43
2.6	1.51	2.46	5.28	3.20	8.86	9.65	6.74	6.01	7.58	6.63	4.17	2.60	5.40
4.6	1.85	3.39	5.59	4.72	9.47	9.73	6.60	6.86	7.90	7.13	4.53	2.69	5.88
6.6	3.11	3.25	6.48	4.03	4.92	2.59	3.29	4.25	8.26	7.28	4.67	3.11	4.61
8.6	4.92	2.86	-0.02	-0.35	-2.51	-2.76	-2.03	-1.64	-0.37	1.88	1.57	1.87	0.29
10.6	-0.48	-1.02	-5.34	-3.59	-5.99	-6.62	-6.95	-5.59	-7.38	-6.30	-4.57	-2.50	-4.69
P. M. 0.6	-4.42	-5.00	-7.97	-5.26	-8.55	-8.85	-7.50	-6.36	-10.03	-10.04	-6.72	-5.22	-7.16
2.6	-4.45	-5.59	-7.44	-5.56	-9.45	-9.16	-6.96	-6.65	-9.97	-10.88	-6.75	-4.98	-7.32
4.6	-2.94	-3.47	-5.04	-4.05	-7.98	-7.00	-5.11	-5.43	-7.21	-7.25	-3.64	-1.98	-5.09
6.6	-0.73	0.27	-0.70	-1.35	-3.60	-4.21	-0.92	-2.03	-2.02	-0.56	-0.68	-0.29	-1.40
8.6	0.00	0.82	1.83	1.89	2.13	2.73	2.73	1.96	2.25	2.51	1.27	0.77	1.75
10.6	0.69	0.83	3.22	2.75	5.13	6.25	4.53	3.50	4.77	4.21	2.37	1.74	3.34

We next took the average between the corrections deduced from observations made at Girard College, Frankford Arsenal, Amherst College and Cambridge, and obtained the following provisional table, which it is presumed must represent nearly the corrections applicable to New Haven.

Corrections to be applied to the means of the hours of observation, to obtain the true mean temperature of New Haven. (Provisional.)

Hour.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Midnight,	1.87	2.17	3.73	4.00	5.17	6.21	5.28	4.75	5.22	4.43	2.77	1.89	3.97
1	2.52	2.71	4.21	4.70	6.08	7.08	6.15	5.37	5.59	4.99	2.90	2.19	4.54
2	2.79	3.13	4.68	5.28	6.91	7.79	6.79	5.93	6.29	5.68	3.28	2.57	5.10
3	3.09	3.67	5.25	5.92	7.67	8.41	7.27	6.30	6.98	6.25	3.57	2.87	5.61
4	3.46	4.18	5.61	6.56	8.11	8.52	7.39	6.66	7.14	6.70	3.86	3.08	5.97
5	3.77	4.47	6.03	6.78	7.96	7.76	7.03	6.57	7.47	7.01	4.14	3.36	6.33
6	3.97	4.60	5.94	6.20	6.21	5.49	5.43	5.45	7.00	6.94	4.08	3.52	5.41
7	4.01	4.40	4.79	4.60	3.77	2.96	3.13	3.58	5.02	5.82	3.73	3.34	4.10
8	3.51	3.26	2.24	2.10	1.00	0.27	0.52	0.91	1.88	3.24	2.30	2.79	2.00
9	1.96	1.37	-0.21	-0.20	-1.45	-2.07	-1.77	-1.50	-1.03	0.41	0.28	1.25	-0.25
10	-0.36	-0.80	-2.39	-2.30	-2.87	-4.02	-3.98	-3.44	-3.72	-2.84	-1.78	-0.98	-2.49
11	-2.56	-2.80	-4.42	-4.14	-5.02	-5.81	-5.83	-5.14	-6.17	-5.45	-3.35	-2.91	-4.47
Noon,	-4.33	-4.47	-5.79	-5.60	-6.24	-7.25	-7.00	-6.12	-7.67	-7.37	-4.87	-4.26	-5.91
1	-5.54	-5.64	-6.79	-6.82	-7.50	-8.26	-7.56	-6.98	-8.56	-8.69	-5.83	-5.35	-6.95
2	-5.90	-6.16	-7.21	-7.55	-8.24	-8.50	-8.00	-7.26	-9.02	-9.40	-6.02	-5.50	-7.40
3	-5.68	-5.97	-7.23	-7.66	-8.40	-8.43	-7.51	-7.29	-8.74	-9.19	-5.60	-4.96	-7.22
4	-4.84	-5.13	-6.58	-7.19	-8.13	-7.91	-6.99	-6.60	-7.92	-8.11	-4.48	-3.66	-6.46
5	-3.25	-3.74	-5.27	-6.14	-6.93	-6.64	-5.86	-5.59	-6.30	-5.85	-3.01	-2.22	-5.06
6	-2.01	-1.90	-3.26	-4.31	-4.95	-5.01	-4.01	-3.63	-3.72	-3.22	-1.39	-1.03	-3.20
7	-0.57	-0.88	-1.01	-1.89	-2.63	-2.61	-1.71	-1.61	-1.34	-0.92	-0.34	-0.26	-1.31
8	0.16	0.00	0.36	0.16	-0.06	0.25	0.82	0.53	0.81	0.74	0.61	0.39	0.39
9	0.88	0.71	1.53	1.65	1.89	2.47	2.51	2.04	2.49	2.00	1.30	0.87	1.70
10	1.34	1.14	2.55	2.48	3.21	4.01	3.56	3.16	3.75	3.01	1.70	1.33	2.64
11	1.74	1.61	3.21	3.45	4.40	5.23	4.37	3.93	4.58	3.91	2.11	1.69	3.35

This table has only been employed to reduce a few observations made at irregular hours to certain fixed hours. After determining the mean temperature of New Haven at certain fixed hours, we employed these results to deduce a more reliable table of the hourly corrections.

The following table shows the results of the entire series of observations at New Haven; the observations being classified by months, and divided into two groups, the first embracing the observations to 1820. Column 1st shows the year of the observations; column 2d shows the time of the morning observation expressed in hours and decimals of an hour; column 3d shows the observed mean temperature; column 4th shows the time of the observation nearest to the hour of greatest heat; column 5th shows the observed temperature; column 6th shows the time of the evening observation; column 7th shows the observed temperature; column 8th shows the mean of the three preceding temperatures; column 9th shows the lowest temperature observed during the month; column 10th shows the highest temperature observed during the month; and column 11th shows the difference between the two numbers last mentioned.

January.

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1779	8	26.0	2.47	32.8	9.13	26.5	28.4	1½	48	46½
1781	8	30.1	1.45	38.9	9.27	33.0	34.0	13	57	44
1782	8	23.7	1.82	29.4	9.35	21.5	24.9	-5½	51	56½
1783	8	23.5	1.75	32.3	9.64	22.5	26.1	-7½	51	58½
1784	8	15.3	1.45	29.7	10.00	18.6	21.2	-2¼	45½	47¼
1785	8	19.9	2.33	30.0	10.34	21.9	23.9	-¾	49	49¾
1786	8	19.7	2.10	31.6	9.76	21.9	24.4	-4	57	61
1787	8	24.1	2.42	33.4	9.64	25.6	27.7	4	51	47
1788	7.38	20.8	12.00	30.8	6.00	25.3	25.6	4	46	42
1789	7.50	24.8	12.02	34.2	5.02	29.2	29.4	6	46	40
1790	7.34	29.3	12.00	37.3	5.64	33.2	33.3	12	56	44
1791	8.00	23.8	2.00	33.5	10.00	26.6	28.0	1	50	49
1792	8.00	15.4	2.19	27.5	9.89	20.1	21.0	-8	49	57
1793	7.96	26.6	2.27	36.0	9.99	29.1	30.6	9½	54	44½
1794	8.00	25.0	1.90	35.8	10.48	26.3	29.0	9	57	48
1795	8.00	22.4	2.15	32.4	10.07	23.9	26.2	1	50	49
1796	7.50	25.2	1	35.3	5.00	29.7	30.1	-6	50	56
1797	7.50	18.3	1	30.1	5.00	25.0	24.5	-10	50	60
1798	7.50	24.7	1	33.2	5.00	28.8	28.9	8	48	40
1799	7.50	23.3	1	32.9	5.00	28.0	28.1	-4	49	53
1800	7.00	21.3	1	32.3	6.29	27.0	26.9	0	48	48
1801	7.00	24.0	2	31.7	9.00	30.4	28.7	0	45	45
1802	7.00	31.4	1	41.2	6.10	34.3	35.6	13	57	44
1803	7.33	23.3	12	36.0	9	24.3	27.9	4	53	49
1804	7.33	18.6	2	33.1	9	21.8	24.5	0	44½	44½
1805	7.33	18.8	1	30.6	10	21.6	23.7	-6	47½	53½
1806	7.33	21.6	1	36.8	10	24.3	27.6	-3	57	60
1807	7.33	19.3	1	34.6	10	22.5	25.5	-2	52	54
1808	7.33	21.3	1	33.6	10	24.3	26.4	3	52	49
1809	7.33	18.5	1	34.4	10	21.5	24.8	-3	54	57
1810	7.33	22.0	1	37.2	10	24.7	28.0	-7	54	61
1811	7.33	22.7	1	33.0	10	25.8	27.2	4	50	46
1812	7.33	21.2	1	28.8	10	22.7	24.2	-6	42	48
1813	7.33	18.0	1	30.1	10	22.1	23.4	-8	49	57
1814	7.33	21.1	1	30.9	10	23.8	25.3	1	40	39
1815	7.33	21.0	1	29.0	10	23.9	24.6	-7	45	52
1816	7.33	17.7	1	28.8	10	22.4	23.0	-6	45	51
1817	7.33	20.7	1	30.7	10	23.7	25.0	-4	48	52
1818	7.33	21.5	1	30.3	10	23.9	25.2	0	43	43
1819	7.33	26.8	1	35.7	10	29.0	30.5	5	56	51
1820	7.33	17.0	2	29.3	10	21.6	22.6	-2	40	42
Mean 41 years,	7.54	22.2	1.30	32.8	8.87	25.2	26.7	-10	57	67

January (continued).

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1821	7.33	13.6	2	25.6	10	18.0	19.1	-12	47	59
1822	7.00	19.4	1	28.9	10	22.0	23.4	-10	53	63
1823	7.33	23.7	1	34.9	10	25.0	27.9	4	47	43
1824	7.33	28.0	1	37.8	10	29.7	31.8	6	52	46
1825	7.33	23.4	1	36.5	10	27.2	29.0	10	48	38
1826	7.00	24.1	1	32.1	10	23.2	26.5	-14	52	66
1827	7.33	17.0	2	28.9	10	20.3	22.1	-7	45	52
1828	7.33	28.9	2	38.3	10	30.2	32.5	6	53	47
1829	7.00	24.7	2	30.4	9	28.2	27.8	-2	46	48
1830	7.33	21.7	2	31.3	9	23.9	25.6	-5	48	53
1831	7.33	19.0	2	29.4	9	21.1	23.2	-8	57	65
1832	7.00	21.2	1	33.0	10	24.3	26.2	-2	55	57
1833	7.00	26.8	1	35.6	10	29.1	30.5	1	64	63
1834	7.33	20.8	2	32.2	10	23.5	25.5	2	57	55
1835	7.00	19.5	1	31.6	10	24.4	25.2	-24	49	73
1836	7.00	20.4	1	29.7	10	22.8	24.3	-2	44	46
1837	7.00	14.9	1	25.4	10	20.1	20.1	-4	45	49
1838	7.65	30.5	2	41.3	10	32.8	34.9	10	56	46
1839	7.03	21.7	1	31.9	9.07	25.0	26.2	-2	51	53
1840	7.00	14.6	1	25.4	9	17.6	19.2	-11	42	53
1841	6.60	27.5	2	34.9	10	31.0	31.1	-12	50	62
1842	6.96	27.3	2.05	38.0	10	32.4	32.6	4	52	48
1843	7.00	26.3	1.00	37.3	10.00	30.7	31.4	-6	55	61
1844	7.00	16.2	1.00	24.1	10.00	18.1	19.5	-5	44	49
1845	7.02	26.2	1.87	36.8	9.14	28.0	30.3	4	48	44
1846	7.22	24.4	1.92	35.8	9.06	27.7	29.3	0	54	54
1847	7	24.0	1.95	34.2	9.00	26.6	28.3	2	53	51
1848	7	26.6	2.00	37.1	9.00	29.8	31.2	-6	49	55
1849	7	17.6	2.01	29.7	9.02	21.7	23.0	-6	47	53
1850	7	25.8	2.00	37.1	9.00	29.1	30.7	13	53	40
1851	7	24.7	2.04	36.9	9.00	26.8	29.5	0	53	53
1852	7	18.8	2.00	31.0	9.06	20.9	23.6	-4	51	55
1853	7	24.8	1	32.9	10	27.2	28.3	7	47	40
1854	7	23.2	1	32.2	10	27.3	27.6	3	48	45
1855	7	28.5	1	35.7	10	29.9	31.4	7	53	46
1856	7	13.6	1	24.5	7	19.1	19.1	-8	38	46
1857	7	11.6	1	22.6	7	17.9	17.4	-18	39	57
1858	7	29.4	1	39.9	7	34.8	34.7	10	53	43
1859	7	19.4	12	31.0	10	27.1	25.8	-14	46	60
1860	7	23.1	12	32.9	5	31.1	29.0	-1	48	49
1861	7	22.9	12	30.1	5	28.9	27.3	-4	43	47
1862	7	22.2	12	29.5	5	28.7	26.8	5	45	40
1863	7	28.2	2	37.6	9	33.0	32.9	7	55	48
1864	7	21.6	2	34.4	9	26.6	27.5	-2	52	54
1865	7	18.0	1.52	28.4	9	21.3	22.6	-3	45	48
Mean 45 years,	7.08	22.3	1.36	32.5	9.12	25.9	26.9	-24	64	88
Mean 86 years,	7.31	22.3	1.33	32.7	9.00	25.6	26.8	-24	64	88

February.

Years.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1780	7.90	27.3	2	36.8	10	24.2	29.4	6	54	48
1781	8	29.8	2	39.6	10	31.1	33.5	0	54	54
1782	8	22.1	2	34.2	10	24.5	26.9	2	53	51
1783	8	28.9	2	38.0	10	30.2	32.4	-13	54	67
1784	7.72	14.6	2	28.3	10	18.8	20.6	-10	45	55
1785	8	22.3	2	33.0	10.14	26.4	27.2	7	54	47
1786	8	23.4	2	36.8	10	29.8	30.0	5	50	45
1787	8	23.9	2	34.8	10	25.9	28.2	2	52	50
1788	7	20.9	12	31.8	6	27.6	26.8	0	45	45
1789	7	17.2	12	30.5	6	24.5	24.1	-12	47	59
1790	7	27.0	12	34.6	6	31.6	31.1	4	49	45
1791	8	21.4	2	31.9	10	24.0	25.8	1	48	47
1792	7	21.3	2	33.5	10	25.4	26.7	8	46	38
1793	7	24.7	2	34.8	10	27.5	29.0	8	50	42
1794	7	21.3	2	34.7	10	26.1	27.4	3	49	46
1795	7	23.0	2	34.1	10	25.7	27.6	0	47	47
1796	7	21.3	1	35.8	5	28.8	28.6	2	51	49
1797	7	29.1	1	39.6	5	35.9	34.9	15	52	37
1798	7.14	21.2	1	31.8	5.04	27.4	26.8	-1	50	51
1799	7.14	21.0	1	32.5	5.04	25.3	26.3	2	47	45
1800	7	23.2	1	34.3	7	30.0	29.2	3	50	47
1801	7	26.0	2	31.7	9	30.4	29.4	0	66	66
1802	7	24.4	2	34.3	9	26.4	28.4	-2	60	62
1803	7	28.5	12	38.3	5	34.1	33.6	6	64	58
1804	7	23.7	2	39.0	9	26.6	29.8	8	56½	48½
1805	7	23.6	1	41.3	10	26.7	30.5	4	58	54
1806	7	28.3	1	43.5	10	31.3	34.4	10	66	56
1807	7	21.4	1	36.7	10	27.4	28.5	-3½	51½	55
1808	7	27.8	1	38.7	10	29.5	32.0	9	63	54
1809	7	16.7	1	39.6	10	21.2	25.8	-9	56	65
1810	7	25.0	1	43.8	10	29.2	32.7	3	68	65
1811	7	23.2	1	33.3	10	25.4	27.3	2	48	46
1812	7	23.1	1	32.2	10	25.7	27.0	5	51	46
1813	7	22.6	1	33.5	10	25.9	27.3	2	42	40
1814	7	25.2	1	35.7	10	28.0	29.6	4	48	44
1815	7	18.5	1	31.4	10	23.2	24.4	3	41	38
1816	7	24.2	1	34.4	10	26.6	28.4	0	52	52
1817	7	14.6	1	26.1	10	18.7	19.8	-12	44	56
1818	7	15.2	1	26.3	10	20.2	20.6	-5	50	55
1819	7	27.0	1	37.4	10	30.1	31.5	10	60	50
1820	7	26.7	1	36.2	10	28.8	30.6	1	49	48
Mean 41 years,	7.22	23.2	1.29	35.0	8.96	27.0	28.3	-13	68	81

February (continued).

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1821	7	27.1	1	36.6	10	29.9	31.2	7	46	39
1822	7	23.2	1	33.2	10	26.7	27.7	2	52	50
1823	7	17.1	1	28.8	10	20.5	22.1	- 2	46	48
1824	7	25.2	12	35.8	10	28.4	29.8	0	52	52
1825	7	25.9	1	38.7	10	28.7	31.1	4	51	47
1826	7	27.1	1	37.1	10	30.6	31.6	-15	56	71
1827	7	25.9	2	35.3	10	28.3	29.8	- 2	49	51
1828	7	33.4	2	44.8	10	36.0	38.1	14	60	46
1829	6.50	16.1	2.50	28.5	9	21.3	22.0	- 2	40	42
1830	7	21.2	2	34.2	9	23.9	26.4	- 3	54	57
1831	7	19.4	2	32.1	9	22.3	24.6	5	45	40
1832	7	24.0	1	33.0	10	26.7	27.9	- 6	58	64
1833	7	20.2	1	32.6	10	25.0	25.9	6	50	44
1834	7	29.9	2	39.9	10	32.1	34.0	6½	56½	50
1835	7	19.2	1	28.9	10	22.4	23.5	- 5	57	62
1836	7	13.3	1	23.4	10	17.1	17.9	- 8	45	53
1837	7	22.6	1	31.2	10	26.0	26.6	- 1	45	46
1838	6.59	18.9	1.93	27.7	10.26	23.2	23.3	7	48	41
1839	7	25.0	1	36.0	9	29.3	30.1	4	49	45
1840	6.96	27.5	1	38.4	9	31.7	32.5	- 4	57	61
1841	6.18	20.9	2.00	34.8	10.41	24.3	26.7	3	54	51
1842	6.79	31.5	2.00	43.8	10.00	34.5	36.6	12	60	48
1843	7.00	15.2	1.00	25.4	10.00	17.5	19.4	- 3	42	45
1844	6.99	24.9	1.00	39.1	9.31	30.3	31.4	5	53	45
1845	7	21.4	1.88	37.6	9.13	26.7	28.6	- 1	58	59
1846	7	18.7	1.92	32.7	9.09	22.2	24.5	- 2	48	50
1847	7	21.8	1.97	35.6	9.01	27.0	28.1	- 2	50	52
1848	7	20.7	2.00	36.1	9.00	25.2	27.3	1	49	48
1849	7	14.6	1.98	31.3	9.00	21.3	22.4	- 6	47	53
1850	7	25.7	2.00	40.0	9.00	30.1	31.9	1	55	54
1851	7	26.5	2.00	39.1	9.00	30.3	32.0	1	50	49
1852	7	23.0	2.02	36.5	8.96	27.5	29.0	2	50	48
1853	7	28.9	1	36.4	10	31.0	32.1	10	49	39
1854	7	24.6	1	33.1	10	27.9	28.5	8	48	40
1855	7	19.9	1	28.4	10	22.6	23.6	-16	41	57
1856	7	18.7	1	30.4	7	24.5	24.5	0	45	45
1857	7	28.9	1	41.5	7	33.6	34.7	3	67	64
1858	7	20.1	1	31.0	7	25.1	25.4	0	48	48
1859	7	25.0	12	36.0	10	31.1	30.7	3	54	51
1860	7	21.5	12	30.7	5	30.5	27.6	- 4	49	53
1861	7	28.2	12	38.3	5	36.3	34.3	- 9	51	60
1862	7	21.6	12	33.4	5	31.7	28.9	10	44	34
1863	7	25.9	2	33.7	9	30.7	30.1	- 7	50	57
1864	7	24.9	2	37.3	9	30.2	30.8	- 4	48	52
1865	7	22.4	1.52	34.1	9	26.5	27.7	0	51	51
Mean 45 years,	6.96	23.1	1.33	34.5	9.11	27.3	28.3	-16	67	83
Mean 86 years,	7.09	23.1	1.31	34.7	9.03	27.2	28.3	-16	68	84

March.

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1779	7.72	35.9 ^o	2	45.7 ^o	10	35.7 ^o	39.1 ^o	12	65	53
1780	8.00	32.6	2	42.1	10	33.0	35.9	12½	56½	44
1781	7.93	35.9	2	44.6	10	35.1	38.5	19	59	40
1782	8.00	33.3	2	41.2	10	30.6	35.0	10	63	53
1783	7.80	32.6	2	42.3	10	33.0	36.0	5	66	61
1784	7.85	29.7	2	41.9	10	31.3	34.3	-5	62	67
1785	7.90	27.3	2	37.6	10	28.3	31.1	8	51	43
1786	7.90	35.3	2	49.4	10	38.7	41.1	17	75	58
1787	7.85	34.8	2	46.5	10	36.4	39.2	17	61	44
1788	6.48	31.2	12	43.2	6	37.8	37.4	9	60	51
1789	6.47	32.6	12	42.7	6	38.0	37.8	9	55	46
1790	6.56	31.3	12	42.5	6	36.8	36.9	5	60	55
1791	6.56	36.1	12	47.8	6	42.6	42.2	14	63	49
1792	7.00	33.6	2	44.8	10	36.9	38.4	22	62	40
1793	7.00	32.4	2	45.8	10	36.4	38.2	7	71	64
1794	7.00	32.2	2	46.1	10	36.4	38.2	5	70	65
1795	7.00	29.2	2	41.5	10	34.0	34.9	16	63	47
1796	6.32	27.9	1	40.7	5.64	33.7	34.1	6	57	51
1797	6.32	32.0	1	43.8	5.64	38.6	38.1	14	58	44
1798	6.40	32.0	1	43.8	5.48	37.7	37.8	18	64	46
1799	6.40	25.3	1	37.7	5.50	30.9	31.3	4	59	55
1800	6.18	28.7	2	42.6	9	37.5	36.3	6	61	55
1801	6.18	36.0	2	47.4	9	39.6	41.0	22	60	38
1802	6.18	32.3	1.50	45.8	9	36.5	38.2	15½	64	48½
1803	7.00	32.0	1	43.7	7	36.7	37.5	3	71	68
1804	6.18	28.0	1	47.3	9	32.0	35.8	5	64	59
1805	6.18	32.3	1	51.4	10	37.5	40.4	16	74	58
1806	6.18	24.9	1	41.4	10	29.3	31.9	8	60	52
1807	6.18	25.4	1	44.0	10	29.6	33.0	11	53	42
1808	6.18	32.9	1	48.0	10	35.3	38.7	14	63	49
1809	6.18	29.4	1	46.0	10	30.1	35.2	7	63	57
1810	6.18	28.0	1	46.5	10	32.4	35.6	17	56	39
1811	6.18	33.7	1	47.5	10	37.1	39.4	10	72	62
1812	6.18	26.0	1	37.5	10	30.2	31.2	0	62	62
1813	6.18	28.5	1	38.4	10	30.2	32.4	8	62	54
1814	6.18	27.2	1	40.5	10	30.9	32.9	5	66	61
1815	6.18	31.4	1	40.9	10	34.4	35.6	13	59	46
1816	6.18	27.2	1	39.7	10	30.3	32.4	5	60	55
1817	6.18	27.3	1	38.8	10	31.0	32.4	8	48	40
1818	6.18	29.5	1	40.9	10	32.5	34.3	13	58	45
1819	6.18	25.0	1	35.4	10	29.4	29.9	9	50	41
1820	6.18	28.7	1	40.5	10	32.4	33.9	3	68	65
Mean 42 years.	6.69	30.7	1.27	43.2	9.03	34.2	36.0	-5	75	80

March (continued).

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1821	6.18	27.3	1	39.9	10	34.4	33.9	11	58	47
1822	7.00	35.7	1	47.3	10	38.0	40.3	21	63	42
1823	6.18	28.9	1	40.2	10	32.6	33.9	0	60	60
1824	6.18	30.5	1	43.8	10	33.3	35.9	17	58	41
1825	6.18	33.8	1	49.6	10	39.1	40.8	21	69	48
1826	7.00	30.5	1	40.9	10	34.0	35.1	14	54	40
1827	6.18	32.0	2	43.3	10	35.4	36.9	14	63	49
1828	6.18	32.6	2	47.0	10	36.7	38.8	13	69	56
1829	5.33	27.0	3	39.3	9	31.0	32.4	10½	69	58½
1830	6.18	34.5	2	47.2	9	35.7	39.1	17	71	54
1831	6.18	35.5	2	48.6	9	39.6	41.2	18	62	44
1832	7.00	32.4	1	43.4	10	34.3	36.7	9	60	51
1833	7.00	26.8	1	40.3	10	33.0	33.4	-6	64	70
1834	6.18	31.0	12	45.4	10	35.7	37.4	18	62	44
1835	7	26.8	1	39.0	10	31.0	32.3	-9	58	67
1836	7	25.7	1	35.1	10	30.1	30.3	7	52	45
1837	7	28.8	1	39.1	10	31.7	33.2	5	56	51
1838	6.29	34.3	1.97	44.6	10.42	38.0	39.0	20	61	41
1839	6.35	30.6	1	44.4	9	35.5	36.8	7	66	59
1840	6.13	32.6	1	44.3	9	35.1	37.3	14	71	56
1841	6.06	31.6	2	44.3	10.30	35.9	37.3	12	67	55
1842	6.63	37.1	2.03	51.1	10	40.3	42.8	16	71	55
1843	6.72	28.8	0.97	37.8	5.40	32.6	33.1	8	49	41
1844	6.65	35.9	1.07	46.0	9.07	37.4	39.8	13	62	49
1845	6.98	32.2	1.98	50.3	9.11	37.0	39.8	18	76	58
1846	7	31.7	1.92	48.4	9.00	35.8	38.6	8	66	58
1847	7	26.6	1.97	41.6	9.00	30.9	33.0	11	55	44
1848	7	27.7	1.98	42.0	9	31.8	33.8	7	61	54
1849	7	32.8	2.01	44.5	9	36.6	38.0	16	66	50
1850	7	29.8	1.99	43.8	9	33.2	35.6	8	61	53
1851	7	32.3	1.93	46.5	9.03	36.7	38.5	19	68	49
1852	7	30.1	1.98	42.9	9.01	33.6	35.5	10	57	47
1853	7	34.5	1	46.6	10	37.2	39.4	12	61	49
1854	7	31.9	1	42.1	10	34.5	36.2	17	64	47
1855	7	30.3	1	41.4	10	31.8	34.5	15	54	39
1856	7	25.3	1	35.5	7	31.6	30.8	3	46	43
1857	7	28.3	1	39.8	7	33.4	33.8	2	57	55
1858	7	28.2	1	39.8	7	34.8	34.3	0	64	64
1859	7	34.1	12	46.7	10	40.0	40.3	10	58	48
1860	7	32.3	12	43.5	5	43.3	39.7	19	63	44
1861	7	32.0	12	41.7	5	40.9	38.2	8	69	61
1862	7	30.1	12	39.5	5	38.5	36.0	20	50	30
1863	7	26.4	2	35.4	9	31.6	31.1	5½	52	46½
1864	7	31.6	2	43.0	9	36.3	37.0	14	55	41
1865	6.50	35.1	1.50	47.5	9	39.1	40.6	17	62	45
Mean 45 years.	6.69	31.0	1.32	43.2	9.01	35.3	36.5	-9	76	85
Mean 87 years.	6.69	30.8	1.29	43.2	9.02	34.7	36.2	-9	76	85

April.

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1779	8	48.6	2	59.7	10	46.8	51.7	24	80	56
1780	8	42.8	2	53.2	10	42.2	46.1	22	65	43
1781	8	44.0	2	54.0	10	43.3	47.1	21	66	45
1782	8	48.6	2	58.2	10	48.2	51.7	25	76	51
1783	8	44.3	2	55.1	10	45.1	48.2	27	84	57
1784	7.93	39.6	2	49.2	10	39.2	42.7	20	70	50
1785	7.92	40.4	2	53.1	10	43.9	45.8	25	82	57
1786	7.67	41.6	2	54.5	10	43.8	46.6	19	70	51
1787	7.93	44.6	2	56.6	10	46.1	49.1	23	84	61
1788	5.96	44.2	12	55.2	6.32	50.0	49.8	27	71	44
1789	5.96	40.4	12	54.6	6.32	48.8	47.9	31	76	45
1790	6	39.8	12	52.0	6	46.2	46.0	28	70	42
1791	6	42.4	12	58.7	6	51.1	50.7	31	74	43
1792	7	42.6	2	55.4	10	45.7	47.9	28	71	43
1793	7	44.1	2	57.8	10	47.2	49.7	30	73	43
1794	7	42.4	2	57.4	10	46.4	48.7	25	78	53
1795	7	41.5	2	56.4	10	44.8	47.6	18	72	54
1796	6	43.8	1	57.7	6	51.7	51.1	32	78	46
1797	6	41.9	1	55.6	6	49.3	48.9	32	77	45
1798	6	43.0	1	57.0	6	50.2	50.1	28	76	48
1799	6	37.7	1	54.1	6	45.0	45.6	23	74	51
1800	5.30	42.3	2	56.2	9	49.3	49.3	30	77	47
1801	5.30	40.2	2	57.0	9	45.1	47.4	31	70	39
1802	5.30	40.1	1.50	58.9	9	45.5	47.8	26	73	47
1803	7.00	44.4	1	57.9	7	49.2	50.5	29	72	43
1804	5.30	38.5	1	58.7	9	44.3	47.2	21	79	58
1805	5.30	41.9	1.50	62.3	10	46.6	50.3	34	83	49
1806	5.30	35.1	2	53.3	10	41.2	43.2	19	67	48
1807	5.30	39.3	2	54.0	10	44.2	45.8	26	72	46
1808	5.30	41.5	1	57.6	10	45.5	48.2	23	77	54
1809	5.30	38.6	1	59.2	10	43.3	47.0	25½	75	49½
1810	5.30	41.2	1	64.4	10	45.7	50.4	28	79	51
1811	5.30	38.7	1	53.9	10	43.4	45.3	25	68	43
1812	5.30	39.0	1	53.3	10	42.5	44.9	25	78	53
1813	5.30	40.7	1	55.0	10	45.3	47.0	26	68	42
1814	5.30	41.4	2	55.4	10	44.7	47.2	32	75	43
1815	5.30	39.4	1	52.2	10	43.3	45.0	30	70	40
1816	5.30	34.9	1	52.4	10	39.7	42.3	25	77	52
1817	5.30	37.3	1	53.5	10	42.6	44.5	23	76	53
1818	5.30	36.5	1	47.7	10	39.2	41.1	28	62	34
1819	5.30	37.8	2	53.2	10	42.0	44.3	27	70	43
1820	5.30	38.2	2	53.9	10	43.1	45.1	20	82	62
Mean 42 years,	6.20	41.1	1.40	55.6	9.09	45.2	47.3	18	84	66

April (continued)

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1821	5.30	34.1	2	50.2	10	38.6	41.0	24	66	42
1822	5.30	39.2	2	53.7	10	43.7	45.5	24	75	51
1823	5.30	40.0	2	56.0	10	43.8	46.6	24	75	51
1824	5.30	39.7	2	55.6	10	44.4	46.6	28	72	44
1825	5.30	38.9	2	58.7	10	45.7	47.8	25	73	48
1826	7.00	36.0	1	49.8	10	40.8	42.2	17	61	44
1827	5.30	42.5	2	57.0	10	45.6	48.4	27	73½	46½
1828	5.00	36.4	3	53.7	9	43.5	44.5	26	71	45
1829	5.00	39.3	3	52.8	9	45.5	45.9	29	70	41
1830	5.30	46.7	2	58.7	9	48.8	51.4	28	77	49
1831	5.30	44.7	2	55.5	9	48.0	49.4	31	68	37
1832	7.00	37.7	1	49.5	10	40.9	42.7	18	70	52
1833	7.00	41.3	1	59.5	10	48.4	49.7	27	77	50
1834	5.30	41.2	12	57.2	10	46.4	48.3	27	75	48
1835	7.00	39.6	1	50.4	10	42.7	44.2	22	71	49
1836	7.00	39.2	1	51.1	10	42.9	44.4	21	66	45
1837	6.52	38.7	2	53.0	9.90	44.3	45.3	28	65	37
1838	6.22	38.0	2	49.3	10.52	41.5	42.9	27	69	42
1839	5.67	40.5	1	58.3	9	47.9	48.9	23	72	49
1840	5.97	40.2	1	56.9	9	47.0	48.0	21	75	54
1841	6.13	39.2	2.07	50.7	10.20	42.6	44.2	26	64	38
1842	6.00	42.7	2.00	58.6	10	47.0	49.4	22	79	57
1843	7.00	43.1	1.00	52.9	10	44.4	46.8	23	69	46
1844	6.06	46.0	1.20	64.2	9.03	51.4	53.9	20	85	65
1845	6.05	40.3	1.96	58.5	9.03	45.1	48.0	29	80	51
1846	6.20	39.8	1.98	59.9	9.02	47.7	49.1	24	84	60
1847	6	36.0	1.89	54.8	9.34	42.4	44.4	11	80	69
1848	6	38.8	1.97	55.6	9.02	44.2	46.2	25	71	46
1849	6	37.8	2	52.4	8.93	42.2	44.1	23	66	43
1850	7	37.7	1	49.1	10.00	37.7	41.5	22	66	44
1851	6	40.2	1.98	53.9	9.01	45.0	46.4	28	66	38
1852	6.78	38.7	1.85	50.1	9.92	41.3	43.4	25	63	38
1853	7	41.9	1	53.7	10	43.9	46.5	28	70	42
1854	7	40.6	1	50.8	10	43.0	44.8	23	72	49
1855	7	40.3	1	52.6	10	45.6	46.2	22	72	50
1856	7	44.7	1	55.8	7	49.1	49.9	26	71	45
1857	7	38.9	1	50.5	7	44.0	44.5	17	62	45
1858	7	40.4	12	54.3	10	45.7	46.8	26	69	43
1859	7	37.6	12	52.3	10	44.8	44.9	26	72	46
1860	7	40.5	12	50.5	5	49.7	46.9	26	63	37
1861	7	43.6	12	53.1	5	52.7	49.8	28	68	40
1862	7	40.9	12	51.2	5	51.2	47.8	27	75	48
1863	7	42.2	2	53.0	9	47.0	47.4	26	70	44
1864	7	40.7	2	54.9	9	45.3	47.0	30	65	35
1865	6	40.6	1.50	55.4	9	45.7	47.2	32	70	38
Mean 45 years,	6.27	40.1	1.43	54.1	9.20	45.1	46.5	11	85	74
Mean 87 years,	6.24	40.6	1.41	54.8	9.14	45.1	46.9	11	85	74

May.

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1779	7	57.2	2	69.2	10	57.8	61.4	40	88	48
1780	7	55.8	2	67.8	10	56.3	60.0	35	87	52
1781	7	55.0	2	66.5	10	53.4	58.3	30	82½	52½
1782	7	55.7	2	67.7	10	56.2	59.9	38	86½	48½
1783	7	55.3	2	66.6	10	55.1	59.0	38	89	51
1784	6.94	53.0	2	65.8	10	53.4	57.4	37	89	52
1785	7	48.5	2	62.5	10	52.6	54.5	37	79	42
1786	7	51.5	2	64.7	10	54.5	56.9	39	82	43
1787	7	50.1	2	64.2	10	54.0	56.1	37	81	44
1788	5.85	51.1	12	64.8	7	59.2	58.4	37	82	45
1789	5.89	48.3	12	62.6	7	55.3	55.4	38	79	41
1790	6	52.0	12	67.6	7	57.9	59.2	35	77	42
1791	6	52.3	12	70.9	7	61.1	61.4	39	87	48
1792	7	53.8	2	67.3	10	56.7	59.3	34	91	57
1793	7	54.3	2	69.8	10	58.7	60.9	33	89	56
1794	6.76	54.4	2	68.7	10	57.3	60.1	31	86	55
1796	6	51.3	1	64.0	7	56.4	57.2	40	73	33
1797	6	49.3	1	63.1	7	57.0	56.5	33	73	40
1798	5.93	54.2	1	69.6	6.83	62.7	62.2	40	83	43
1799	5.93	49.2	1	66.8	6.84	57.8	57.9	33	87	54
1800	4.66	50.8	2	62.5	9	58.7	57.3	34	75	41
1801	6.93	56.7	1	69.2	7	61.1	62.3	40	93	53
1802	4.66	50.2	2	64.9	9	54.2	56.4	33½	80	46½
1803	7.00	48.1	1	65.9	7	55.7	56.6	30	77	47
1804	4.66	52.2	1	70.9	9	56.4	59.8	39	81	42
1805	4.66	48.3	1.50	71.5	10	53.9	57.9	32	83	51
1806	4.66	48.6	1.50	71.2	10	54.0	57.9	35	88	53
1807	4.66	47.5	2	66.0	10	51.2	54.9	35	78	43
1808	4.66	49.5	2	64.2	10	52.4	55.4	38	77	39
1809	4.66	51.7	2	68.4	10	52.7	57.6	40	79	39
1810	4.66	48.9	1	73.0	10	53.5	58.5	35	90	55
1811	4.66	47.5	1.50	65.7	10	52.5	55.2	34	77	43
1812	4.66	45.3	2	58.7	10	48.4	50.8	32	71	39
1813	4.66	47.8	1	60.8	10	52.2	53.6	37	73	36
1814	4.66	53.2	2	68.7	10	56.7	59.5	38	81	43
1815	4.66	44.8	2	59.8	10	49.2	51.3	35	85	50
1816	4.66	45.2	2	61.0	10	49.7	52.0	30	79	49
1817	4.66	45.2	2	60.1	10	50.1	51.8	36	72	36
1818	4.66	47.3	2	61.5	10	51.1	53.3	36	76	40
1819	4.66	48.6	2	61.8	10	50.6	53.7	35	70	35
1820	4.66	48.4	2	60.1	10	51.7	53.4	33	76	43
Mean 41 years,	5.70	50.7	1 55	65.8	9.19	54.9	57.1	30	93	63

May (continued).

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1821	7.00	53.2	2	64.5	10	54.2	57.3	39	86	47
1822	4.66	50.9	2	68.1	10	56.7	58.6	37	82	45
1823	4.66	51.6	2	62.9	10	51.4	55.3	32	85	53
1824	4.66	49.1	2	69.1	10	53.8	57.3	32	75	43
1825	7.00	54.2	2	65.8	10	54.1	58.0	33	79	46
1826	7.00	57.1	1	72.8	10	61.4	63.8	38	92	54
1827	4.66	46.4	2	64.4	10	54.0	54.9	35	78	43
1828	4.00	50.4	3	67.5	9	54.4	57.4	40	86	46
1829	4.00	51.2	3	68.7	9	58.3	59.4	36	86	50
1830	4.00	52.1	3	68.2	9	56.4	58.9	33	73	40
1831	4.66	53.3	12	68.3	9	56.7	59.4	35	84	49
1832	7.00	49.0	1	59.6	10	51.1	53.2	33	72	39
1833	7.00	55.6	1	65.8	10	55.6	59.0	38	81	43
1834	4.66	48.2	12	63.3	10	52.4	54.6	31	74	43
1835	7.00	51.0	1	62.1	10	55.6	56.2	37	82	45
1836	7.00	52.6	1	64.9	10	55.3	57.6	30	81	51
1837	6.75	50.6	2.03	65.0	9.79	52.3	56.0	27	79	52
1838	7.00	50.0	1	60.5	10.00	53.2	54.6	36	70	34
1839	5.00	51.0	1	65.1	9.00	55.0	57.0	32	83	51
1840	5.13	49.9	1	66.7	9.00	54.7	57.1	38	84	46
1841	6.00	49.2	2.31	61.4	9.96	52.6	54.4	35	76	41
1842	6.05	49.6	2.20	61.8	10.00	54.4	55.3	33	76	43
1843	6.00	49.9	2.00	68.6	10.00	54.9	57.8	36	87	51
1844	5.73	54.9	1.86	71.1	9.13	60.7	62.2	39	86	47
1845	6.00	49.9	1.95	70.1	9.05	54.9	58.3	35	94	59
1846	6.00	52.9	1.93	67.4	9.00	57.2	59.2	35	78	43
1847	6.12	50.0	1.73	67.6	9.76	54.0	57.2	38	78	40
1848	6.00	54.8	1.97	66.6	8.98	58.3	59.9	39	83	44
1849	6.00	48.9	1.97	62.7	9.09	52.4	54.7	38	81	43
1850	7.00	52.3	1.00	59.5	10.00	50.0	53.9	33	83	50
1851	6.37	51.9	2.25	64.5	9.93	51.9	56.1	29	85	56
1852	7	53.3	1	63.9	10	54.5	57.2	38	79	41
1853	7	53.8	1	66.2	10	54.7	58.2	38	82	44
1854	7	54.7	1	66.3	10	56.9	59.3	33	78	45
1855	7	53.5	1	65.4	10	53.4	57.4	33	81	48
1856	7	53.2	1	61.2	7	55.8	56.7	37	84	47
1857	7	49.1	1	60.8	10	51.6	53.8	37	81	44
1858	7	49.2	12	60.1	10	53.3	54.2	34	72	38
1859	7	51.4	12	64.8	10	56.0	57.4	36	85	49
1860	7	52.7	12	65.2	5	62.7	60.2	38	77	39
1861	6.50	50.0	12	62.2	5	60.5	57.6	35	76	41
1862	7	53.5	12	66.2	5	65.3	61.7	37	83	46
1863	7	55.9	2	66.7	9	59.0	60.5	37	89 $\frac{1}{2}$	52 $\frac{1}{2}$
1864	7	54.0	12	66.0	10	54.8	58.3	37	89	52
1865	6	51.0	1.50	65.0	9	56.0	57.3	40	86	46
Mean 45 years,	6.15	51.7	1.37	65.2	9.30	55.4	57.4	27	94	67
Mean 86 years,	5.92	51.2	1.46	65.5	9.24	55.2	57.3	27	94	67

June.

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1779	7	67.1	2	78.8	10	66.1	70.6	50	94½	44½
1780	7	63.2	2	75.8	10	62.7	67.2	41	94	53
1781	7	63.1	2	74.3	10	61.9	66.4	49	88½	39½
1782	7	66.5	2	78.0	10	65.5	70.0	52	96¾	44¾
1783	7	66.0	2	78.5	10	65.5	70.0	50	93	43
1784	7	62.2	2	77.6	10	64.2	68.0	41	98	57
1785	7	63.9	2	78.3	10	66.3	69.5	41	95	54
1786	7	63.8	2	77.6	10	67.5	69.6	51	95	44
1787	7	59.7	2	76.0	10	63.0	66.2	35	88	53
1788	6	63.3	12	74.4	7	66.6	68.1	45	93	48
1789	6	62.2	12	76.4	7	71.0	69.9	47	92	45
1790	6	63.8	12	78.2	7	70.2	70.7	50	90	40
1791	6	61.4	12	75.7	7	68.5	68.5	48	88	40
1792	7	60.5	2	74.2	10	62.9	65.9	43	98	55
1793	7	63.6	2	77.1	10	65.5	68.7	43	97	54
1794	7	62.0	2	74.9	10	63.6	66.8	47	87	40
1796	6	61.3	1	75.4	7	67.5	68.1	46	87	41
1797	6	58.9	1	76.6	7	69.3	68.3	45	89	44
1798	6.07	63.4	1	78.7	7	69.0	70.4	48	88	40
1799	6.07	62.1	1	78.8	7	69.6	70.2	45	94	49
1800	4.50	61.5	2	77.1	9	68.0	68.9	43	91	48
1801	7.00	61.4	1	76.1	7	67.9	68.5	42	93	51
1802	4.50	61.7	2	75.0	9	66.5	67.7	49	85	36
1803	6.67	62.9	1	77.8	7	71.0	70.6	48	98	50
1804	5.00	62.8	2	77.0	9	67.9	69.2	55	89	34
1805	4.50	58.8	1.50	79.1	10	64.6	67.5	46	88	42
1806	4.50	60.2	1.50	78.4	10	65.5	68.0	40	89	49
1807	4.50	56.3	2	75.6	10	62.5	64.8	46	89	43
1808	4.50	60.9	2	76.7	10	65.4	67.7	48	88	40
1809	4.50	58.8	2	77.2	10	61.7	65.9	44	90	46
1810	4.50	60.0	1	79.0	10	64.7	67.9	46	90	44
1811	4.50	60.0	2	76.0	10	63.8	66.6	48	90	42
1812	4.50	59.3	2	72.3	10	62.9	64.8	49	82	33
1813	4.50	61.1	2	73.0	10	66.3	66.8	47	87	40
1814	4.50	58.6	2	72.9	10	63.6	65.0	46	79	33
1815	4.50	57.9	2	72.1	10	62.6	64.2	47	86	39
1816	4.50	53.8	2	68.4	10	58.8	60.3	35	88	53
1817	4.50	55.4	2	68.0	10	60.3	61.2	42	79	37
1818	4.50	59.9	2	76.0	10	64.1	66.7	49	91	42
1819	4.50	59.7	2	72.9	10	64.9	65.8	50	87	37
1820	4.50	57.4	2	75.6	10	63.0	65.3	46	91	45
Mean 41 years,	5.65	61.1	1.61	75.9	9.20	65.4	67.5	35	98	63

June (continued).

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1821	4.50	59.6	2	74.7	10	63.0	65.8	47	85	38
1822	4.50	58.2	2	74.4	10	63.0	65.2	46	86	40
1823	4.50	58.3	2	76.2	10	63.1	65.9	42	88	46
1824	7.00	62.6	2	72.8	9	62.5	66.0	44	85	41
1825	7.00	65.9	2	77.4	9	67.1	70.1	50	93	43
1826	7.00	62.4	1	75.5	10	65.7	67.9	50	91	41
1827	4.50	56.2	2	73.8	10	61.8	63.9	42	83½	41½
1828	4.00	62.2	3	80.1	9	69.2	70.5	49	89	40
1829	4.00	59.7	3	72.5	9	64.3	65.5	48	83	35
1830	4.50	58.7	2	74.4	9	65.3	66.1	49	86	37
1831	4.50	64.2	2	79.0	9	68.0	70.4	47	91	44
1832	7.00	60.0	1	71.2	10	60.0	63.7	44	86	42
1833	7.00	57.8	1	70.6	10	61.9	63.4	41	80	39
1834	4.50	58.7	2	73.1	10	62.5	64.8	48	85	37
1835	7.00	62.2	1	71.7	10	62.4	65.4	47	81	34
1836	7.00	58.0	1	69.3	10	60.9	62.7	42	83	41
1837	6.28	59.9	2	70.7	9.73	62.8	64.5	49	82	33
1838	6.03	64.1	1.79	76.1	10.38	66.4	68.9	50	89	39
1839	5.00	57.1	1.00	71.2	9.00	62.0	63.4	46	82	36
1840	5.00	59.0	1.00	75.4	9.00	64.1	66.2	46	87	41
1841	6.00	65.0	2.07	77.4	10.12	68.0	70.1	50	92	42
1842	5.86	58.9	2.07	72.3	10.04	62.0	64.6	45	82	37
1843	7.00	61.6	1.00	72.6	10.00	63.7	66.0	36	90	54
1844	6.01	61.8	2.03	74.8	9.02	66.5	67.7	48	90	42
1845	6.00	59.3	2.03	79.1	9.08	64.9	67.8	43	100	57
1846	6.00	59.7	2.04	75.1	9.07	63.6	66.1	47	83	36
1847	6.17	60.2	1.78	76.3	10.29	63.3	66.6	47	92	45
1848	6.00	61.4	2.03	75.8	9.06	65.1	67.4	46	93	47
1849	6.25	61.4	1.72	76.0	9.81	65.6	67.7	50	95½	45½
1850	7	63.5	1	77.0	10.00	63.4	68.0	44	85	41
1851	7	61.7	1	74.3	10	61.3	65.8	45	85	40
1852	7	62.2	1	73.3	10	63.3	66.3	45	94	49
1853	7	63.2	1	75.1	10	63.9	67.4	44	94	50
1854	7	62.3	1	73.9	10	65.0	67.1	42	87	45
1855	7	64.0	1	71.7	10	61.8	65.8	49	93	44
1856	7	65.0	1	74.6	7	70.4	70.0	45	89	44
1857	7	59.0	1	69.0	10	59.5	62.5	44	80	36
1858	7	63.4	12	74.2	10	65.6	67.7	44	91	47
1859	7	59.4	12	71.3	10	61.8	64.2	37	90	53
1860	7	62.5	12	74.9	5	72.7	70.0	49	88	39
1861	6	61.7	12	74.2	5	72.4	69.4	51	85	34
1862	7	61.4	12	72.1	5	71.6	68.4	47	89	42
1863	7	60.9	2	73.3	9	63.1	65.8	48	92	44
1864	6	64.2	1.80	78.2	9	68.2	70.2	41	102	61
1865	6	64.1	1.50	78.4	9	68.4	70.3	52	92½	40½
Mean 45 years,	6.11	61.2	1.44	74.3	9.28	64.7	66.7	36	102	66
Mean 86 years,	5.88	61.1	1.53	75.1	9.24	65.1	67.1	35	102	67

July.

Years.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1778	7	69.6	2	82.8	10	70.1	74.2	50	95	45
1780	7	70.6	2	84.3	10	72.7	75.9	58	96½	38½
1781	7	71.1	2	81.8	10	70.9	74.6	55	100	45
1782	7	66.4	2	77.4	10	67.0	70.3	55	90	35
1783	7	67.4	2	79.2	10	66.6	71.1	45	93	48
1784	7	66.5	2	79.9	10	68.8	71.7	52	92	40
1785	7	67.3	2	80.7	10	67.7	71.9	55	92	47
1786	7	65.9	2	81.5	10	69.5	72.3	52	89½	37½
1787	7	64.3	2	78.9	10	66.6	69.9	47	87	40
1788	6	68.2	12	80.9	7	73.7	74.3	54	94	40
1789	6	67.1	12	83.3	7	73.5	74.6	58	94	36
1790	6	63.0	2	80.5	9	69.1	70.9	53	93	40
1791	6	62.8	12	79.6	7	71.9	71.4	53	91	38
1792	7	65.3	2	78.6	10	67.8	70.6	52	92	40
1793	7	68.5	2	81.2	10	69.9	73.2	56	96	40
1794	7	65.9	2	79.9	10	67.7	71.2	52	93	41
1796	6	65.8	1	80.6	7	72.4	72.9	58	91	33
1797	6	68.1	1	83.3	7	75.9	75.8	60	95	35
1798	6.03	65.4	1	81.2	7	72.0	72.9	52	101	49
1799	6.03	66.9	1	82.5	7	74.2	74.5	52	94	42
1800	4.66	65.8	2	82.7	9	74.5	74.3	52	100	48
1801	7.00	68.6	1	78.9	9	74.3	73.9	52	97	45
1802	4.66	66.6	2.50	81.5	9	70.8	73.0	52	94	42
1803	6.00	68.3	1	83.8	7	74.6	75.6	54	91	37
1804	5.00	64.5	2	76.7	9	71.1	70.8	53	88	35
1805	4.66	63.5	2	83.7	10	71.8	73.0	52	92	40
1806	4.66	61.4	2	80.8	10	68.1	70.1	47	89	42
1807	4.66	65.7	2	81.0	10	70.3	72.3	53	85	32
1808	4.66	66.3	2	79.6	10	69.7	71.9	52	92	40
1809	4.66	60.0	2	78.8	10	64.3	67.7	51	86	35
1810	4.66	61.5	2	80.6	10	66.3	69.5	51	89	38
1811	4.66	65.4	2	78.1	10	69.8	71.1	46	94	48
1812	4.66	60.7	2	75.8	10	65.9	67.5	48	86	38
1813	4.66	65.0	2	78.0	10	69.6	70.9	53	91	38
1814	4.66	62.2	2	77.6	10	65.8	68.5	44	85	41
1815	4.66	65.8	2	78.3	10	69.8	71.3	53	89	36
1816	4.66	57.4	2	74.3	10	63.3	65.0	46	82	36
1817	4.66	60.7	2	75.5	10	65.5	67.2	50	83	33
1818	4.66	64.9	2	78.7	10	69.0	70.9	55	92	37
1819	4.66	63.1	2	80.1	10	67.8	70.3	48	92	44
1820	4.66	67.2	2	81.1	10	70.3	72.9	53	93	40
Mean 41 years,	5.71	65.4	1.72	79.8	9.29	69.8	71.8	44	101	57

July (continued).

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1821	4.66	59.7 ^o	2	77.2 ^o	10	64.7 ^o	67.2 ^o	51 ^o	87 ^o	36 ^o
1822	4.66	64.3	2	79.7	10	68.6	70.9	49	85	36
1823	4.66	66.0	1	80.8	10	68.3	71.7	55	90	35
1824	7	68.8	2	78.7	9	68.1	71.9	58	90	32
1825	7	72.1	2	84.7	9	72.7	76.5	56	96	40
1826	7	67.1	2	79.5	9	69.2	71.9	52	88	36
1827	4.66	62.8	2	77.0	10	67.2	69.0	54	86	32
1828	4.00	64.5	3	79.9	9	70.3	71.6	58	90	32
1829	4.00	63.2	3	77.1	9	67.6	69.3	52	86	34
1830	4.66	67.3	2	80.8	9	70.7	72.9	51	95½	44½
1831	4.66	65.9	12	80.1	9	71.0	72.3	50	86	36
1832	7	66.5	1	77.2	10	66.1	69.9	48	90	42
1833	7	66.0	1	76.9	10	68.5	70.5	52	89	37
1834	7	67.9	1	78.4	10	71.1	72.5	50	90	40
1835	7	67.9	1	76.7	10	69.2	71.3	52	87	35
1836	7	67.2	1	75.9	10	69.5	70.9	54	88	34
1837	6.10	63.3	2	77.0	10	65.7	68.7	54	84	30
1838	6.21	68.0	1.96	80.8	10.33	71.7	73.5	59	91	32
1839	5	65.3	1	80.4	9	71.0	72.2	56	88	32
1840	5	64.6	1	81.5	9	70.2	72.1	55	91	36
1841	6	65.8	2.04	79.3	10.06	69.8	71.6	56	89	33
1842	6	69.0	2.03	78.2	10.02	71.1	72.8	56	89	33
1843	7	66.3	1.00	76.0	10.00	68.2	70.2	52	91	39
1844	6.01	66.3	1.95	77.7	9.32	69.7	71.2	53	87	34
1845	6	64.4	1.99	83.1	9.05	71.1	72.9	48	98	50
1846	6	66.3	2.04	79.5	9.02	70.5	72.1	53	94	41
1847	6.27	67.6	1.81	84.5	10.21	70.5	74.2	56	93	37
1848	6.00	65.3	2.00	77.4	9.00	68.7	70.5	56	85	29
1849	6.12	65.8	1.85	79.5	9.44	69.3	71.5	53	99	46
1850	7.00	69.6	1.00	78.8	10.00	69.5	72.6	54	88	34
1851	6.61	66.8	2.45	79.3	10.05	69.5	71.9	54	88	34
1852	7	68.5	1	77.6	10	69.9	72.0	53	90	37
1853	7	66.0	1	73.2	10	66.8	68.7	53	82	29
1854	7	71.0	1	80.8	10	72.0	74.6	56	95	39
1855	7	70.2	1	78.6	10	69.5	72.8	53	94	41
1856	7	69.2	1	79.1	7	74.8	74.4	56	92	36
1857	7	67.4	1	76.9	7	72.1	72.1	49	85	36
1858	7	64.0	12	76.7	10	68.8	69.8	49	90	41
1859	7	63.4	12	75.1	10	65.7	68.1	46	90	44
1860	7	66.4	12	75.6	5	74.9	72.3	58	88	30
1861	6	66.4	12	78.3	5	77.6	74.1	56	92	36
1862	7	66.7	12	78.4	5	77.2	74.1	54	94	40
1863	7	70.4	2	78.5	9	74.8	74.6	60	88	28
1864	6	69.0	1.84	82.4	9	73.1	74.8	53	91	38
1865	6	67.5	1.50	78.5	9	69.5	71.8	51	91½	40½
Mean 45 years,	6.18	66.6	1.41	78.8	9.19	70.1	71.8	46	99	53
Mean 86 years,	5.95	66.0	1.56	79.3	9.24	70.0	71.8	44	101	57

August.

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1778	6	68.3	2	81.2	10	70.5	73.3	51	97	46
1780	7	72.0	2	82.8	10	72.4	75.7	53	98	45
1781	7	69.0	2	81.1	10	67.8	72.6	55	93	38
1782	7	68.9	2	81.1	10	69.4	73.1	50	92	42
1783	7	66.6	2	79.7	10	66.8	71.0	51	94	43
1784	6.76	65.6	2	81.1	10	69.5	72.1	49	91	42
1785	6.81	64.9	2	79.0	10	67.6	70.5	51	94	43
1786	6.83	62.3	2	75.9	10	64.7	67.6	44	89	45
1787	6.50	63.3	2	78.0	10	66.5	69.3	50	91	41
1788	6	65.1	12	79.7	7	71.7	72.2	53	92	39
1789	6	67.2	12	81.2	7	72.8	73.7	54	95	41
1790	6	66.2	12	80.8	7	72.0	73.0	52	95	43
1791	6	64.5	12	78.2	7	71.8	71.5	52	89	37
1792	7	63.0	2	79.0	10	66.6	69.5	47	92	45
1793	7	65.7	2	80.3	10	68.4	71.5	51	90	39
1794	7	65.8	2	79.6	10	68.2	71.2	52	94	42
1796	6	63.7	1	78.9	7	71.2	71.3	51	92	41
1797	6	65.3	1	79.6	7	71.0	72.0	49	87	38
1798	6	69.9	1	82.3	7	76.4	76.2	54	96	42
1799	6	65.5	1	81.3	7	73.2	73.3	51	92	41
1800	5.16	63.6	2	76.9	9	70.6	70.4	49	89	40
1801	6.66	64.7	2	78.9	7	70.8	71.5	49	95	46
1802	5.16	67.0	2.50	81.5	9	70.8	73.1	55	91	36
1803	6.00	65.4	1	79.3	7	75.5	73.4	49	91	42
1804	5.00	64.5	2	76.7	9	70.8	70.7	55	88	33
1805	6.00	69.2	1	81.6	6	78.2	76.3	55	93	38
1806	5.16	62.0	2	77.0	10	67.0	68.7	50	84	34
1807	5.16	64.6	2	79.3	10	69.4	71.1	49	87	38
1808	5.16	57.6	2	77.5	10	65.2	66.8	47	87	40
1809	5.16	60.4	2	79.6	10	65.7	68.6	43	87	44
1810	5.16	61.8	1	76.5	10	65.9	68.1	48	85	37
1811	5.16	61.6	2	76.2	10	66.2	68.0	50	87	37
1812	5.16	61.7	2	75.0	10	65.3	67.3	47	82	35
1813	5.16	65.4	2	79.6	10	71.5	72.2	55	87	32
1814	5.16	63.5	2	76.5	10	67.5	69.2	47	85	38
1815	5.16	61.4	2	72.3	10	65.1	66.3	52	85	33
1816	5.16	60.8	2	76.2	10	65.7	67.6	40	86	46
1817	5.16	62.1	2	76.1	10	66.3	68.2	46	85	39
1818	5.16	60.0	2	75.8	10	64.4	66.7	48	84	36
1819	5.16	62.9	2	77.7	10	66.8	69.1	47	89	42
1820	5.16	61.7	2	74.5	10	66.2	67.5	50	90	40
Mean 41 years,	5.88	64.5	1.65	78.7	9.10	69.2	70.8	40	98	58

August (continued).

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1821	5.16	62.7	2	80.5	10	69.4	70.9	54	89	35
1822	5.16	58.3	2	77.2	10	64.8	66.8	50	85	35
1823	5.16	63.6	2	79.7	10	65.8	69.7	48	89	41
1824	7	65.6	2	74.9	9	65.5	68.7	49	86	37
1825	7	67.2	2	77.3	9	68.9	71.1	51	92	41
1826	5.16	65.1	2	75.0	10	69.0	69.7	55	82	27
1827	5.16	61.1	2	75.7	10	65.8	67.5	50	93	43
1828	5.00	63.1	2.50	82.4	9	71.5	72.3	52	91	39
1829	5.00	68.0	2.50	76.3	9	69.2	71.2	51	84	33
1830	5.16	64.2	2	78.5	9	67.6	70.1	51	88½	37½
1831	5.16	67.1	2	81.3	9	71.4	73.3	50	89	39
1832	7	65.3	1	75.9	10	65.8	69.0	46	83	37
1833	7	64.1	1	75.9	10	67.0	69.0	40	88	48
1834	7	62.6	1	76.2	10	68.1	69.0	39	89	50
1835	7	64.4	1	74.2	10	66.1	68.2	43	87	44
1836	7	60.1	1	72.4	10	64.1	65.5	43	87	44
1837	6.30	62.8	2	75.1	10	64.9	67.6	48	90	42
1838	5.90	66.8	1.90	78.6	10.50	68.6	71.3	57	90	33
1839	5.10	64.0	1.00	75.9	9	67.6	69.2	53	86	33
1840	5.00	65.2	1.00	79.7	9	70.0	71.6	54	88	34
1841	6.00	66.3	2.39	78.8	10	71.3	72.1	55	85	30
1842	6.15	64.4	2.02	76.4	10	67.9	69.6	53	82	29
1843	7.00	67.1	1.00	74.8	10	68.5	70.1	55	87	32
1844	6.01	64.5	1.89	77.8	9.00	70.1	70.8	50	88	38
1845	6.00	66.2	2.00	82.3	9.05	71.9	73.5	53	89	36
1846	6.00	64.8	2.00	79.3	9.02	70.2	71.4	53	90	37
1847	6.22	63.9	1.93	78.6	9.75	67.5	70.0	49	86	37
1848	6.00	63.2	2.00	79.0	9	68.8	70.3	53	86	33
1849	6.00	63.9	2.00	78.3	9	69.2	70.5	55	83	28
1850	7.00	65.7	1.00	74.8	10	65.7	68.7	50	83	33
1851	6.89	63.7	2.76	74.7	10	66.1	68.2	53	83	30
1852	7	63.2	1	74.1	10	64.3	67.2	48	78	30
1853	7	66.7	1	75.2	10	67.3	69.7	52	87	35
1854	7	65.3	1	77.6	10	67.6	70.2	50	96	46
1855	7	63.9	1	74.5	10	64.8	67.7	42	82	40
1856	7	64.5	1	74.1	7	67.8	68.8	48	82	34
1857	7	66.0	1	75.7	7	69.8	70.5	55	88	33
1858	7	60.6	12	73.9	10	65.6	66.7	40	84	44
1859	7	62.2	12	75.4	10	65.1	67.6	50	84	34
1860	7	66.8	12	76.0	5	75.3	72.7	53	87	34
1861	6	64.7	12	75.9	5	73.9	71.5	53	90	37
1862	7	66.1	12	77.9	5	77.9	74.0	49	97	48
1863	7	69.8	2	80.5	9	73.2	74.5	50	98	48
1864	6.50	67.0	1.79	79.0	9.50	69.7	71.9	50	90	40
1865	6	63.4	1.50	76.5	9	67.6	69.2	43	88	45
Mean 45 years,	6.27	64.6	1.47	77.0	9.20	68.4	70.0	39	98	59
Mean 86 years,	6.07	64.5	1.56	77.8	9.15	68.8	70.4	39	98	59

September.

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1779	6.42	55.0	2	71.5	10	57.6	61.4	39	88	49
1780	7	54.1	2	71.4	10	57.7	61.1	39	85	46
1781	7	57.3	2	71.8	10	58.3	62.5	44	84	40
1782	7	60.5	2	74.5	10	61.1	65.4	44	92	48
1783	7	52.3	2	66.5	10	54.8	57.9	30	79	49
1784	7	57.9	2	71.2	10	58.1	62.4	34	87	53
1785	7	54.4	2	69.0	10	56.5	60.0	40	82	42
1786	7	55.9	2	71.5	10	59.4	62.3	35	84	49
1787	6.73	54.6	2	69.0	10	57.1	60.2	36	85	49
1788	6.65	58.6	12	71.2	6.28	65.2	65.0	39	90	51
1789	6.65	57.3	12	71.8	6.29	64.9	64.7	40	82	42
1790	6.03	58.1	12	72.3	6.27	65.3	65.2	36	86	50
1791	6.03	56.8	12	68.2	6.26	62.2	62.4	38	82	44
1792	7	52.3	2	67.9	10	56.3	58.8	35	84	49
1793	7	57.7	2	72.4	10	60.4	63.5	37	88	51
1794	7	59.4	2	74.4	10	61.7	65.2	38	91	53
1796	6	56.3	1	70.1	6.70	64.3	63.6	42	83	41
1797	6	53.0	1	71.1	6.70	63.3	62.5	36	88	52
1798	6.17	59.0	1	73.5	6.67	66.2	66.2	37	85	48
1799	6.17	58.6	1	69.4	6.67	63.9	64.0	41	89	48
1800	6	58.8	2	70.1	7	64.9	64.6	45	84	39
1801	6	61.0	2	75.7	7	67.7	68.1	38	90	52
1802	6	59.6	2	74.1	9	63.8	65.8	40	87	47
1803	6	54.6	1	72.6	7	65.1	64.1	40	83	43
1804	5.66	59.1	2	72.7	9	64.9	65.6	34	88	54
1805	5.66	59.4	1.50	75.2	10	64.5	66.4	40	87	47
1806	5.66	57.9	1	73.6	10	62.3	64.6	38	85	47
1807	5.66	52.6	2	71.9	10	57.9	60.8	43	81	38
1808	5.66	54.9	2	73.1	10	60.0	62.7	31	84	53
1809	5.66	49.8	2	74.1	10	56.2	60.0	36	81	45
1810	5.66	56.0	1	73.4	10	60.3	63.2	40	82	42
1811	5.66	56.5	2	71.3	10	60.7	62.8	40	84	44
1812	5.66	52.0	1	66.7	10	56.3	58.3	34	79	45
1813	5.66	61.0	1	72.5	10	65.8	66.4	48	86	38
1814	5.66	56.3	1	68.1	10	60.3	61.6	40	83	43
1815	5.66	53.9	1	67.0	10	58.2	59.7	36	81	45
1816	5.66	50.5	2	65.4	10	56.8	57.6	28	80	52
1817	5.66	56.3	2	70.3	10	61.0	62.5	41	83	42
1818	5.66	52.0	2	68.8	10	56.7	59.2	36	80	44
1819	5.66	60.5	1	72.5	10	63.1	65.4	46	91	45
1820	5.66	56.9	2	73.9	10	61.8	64.2	37	85	48
Mean 41 years,	6.17	56.3	1.50	71.3	9.04	61.1	62.9	28	92	64

September (continued).

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1821	5.66	54.0	2	73.0	10	61.1	62.7	40	82	42
1822	5.66	58.1	2	73.7	10	62.9	64.9	36	85	49
1823	5.66	54.2	2	68.7	10	58.1	60.3	37	84	47
1824	7.00	59.8	2	69.6	9	60.1	63.2	34	84	50
1825	7.00	58.6	2	69.4	9	59.8	62.6	40	82	42
1826	5.66	58.5	2	68.5	10	61.6	62.9	42	82	40
1827	5.66	57.2	2	70.5	10	61.1	62.9	44	80	36
1828	5.00	56.3	2.50	72.0	9	64.6	64.3	44	90	46
1829	5.00	52.3	2.50	71.0	9	59.3	60.9	31	86	55
1830	5.66	57.6	2	70.4	9	58.4	62.1	34	78	44
1831	7.00	59.6	1	68.9	10	62.7	63.7	38	83	45
1832	7.00	54.6	1	67.6	10	59.4	60.5	35	79	44
1833	7.00	56.8	1	69.3	10	59.5	61.9	35	89	54
1834	7.00	56.9	1	67.9	10	60.5	61.8	27	80	53
1835	7.00	51.7	1	66.5	10	55.9	58.0	32	79	47
1836	7.00	57.3	1	67.3	10	59.8	61.5	32	82	50
1837	6.11	51.6	2	67.7	10	54.9	58.1	35	84	49
1838	7.00	57.8	1	67.3	10	61.5	62.2	35	78	43
1839	6.00	55.2	1	71.2	9	60.9	62.4	40	82	42
1840	5.60	52.9	1	68.9	9	57.9	59.9	36	80	44
1841	7.00	60.4	1	68.8	10	63.5	64.2	43	81	38
1842	7.00	54.8	1	66.9	10	57.8	59.8	31	79	48
1843	7.00	59.1	1	68.3	10	61.3	62.9	33	86	53
1844	6.11	56.4	1.91	73.2	9	62.7	64.1	38	85	47
1845	6.00	54.5	1.98	69.8	9.03	60.5	61.6	38	81	43
1846	6.00	59.6	2.00	75.7	9.02	65.2	66.8	38	88	50
1847	6.00	56.2	2.00	68.8	9.08	59.8	61.6	38	82	44
1848	6.24	54.5	2.00	69.4	9.32	60.5	61.5	36	83	47
1849	6.00	53.7	1.97	69.9	9.12	59.7	61.1	44	86	42
1850	7.00	57.4	1.00	69.4	10.00	58.5	61.8	40	79	39
1851	6.56	56.3	2.79	72.4	9.82	61.8	63.5	31	88	57
1852	7	56.4	1	67.0	10	59.5	61.0	39	79	40
1853	7	58.8	1	68.1	10	60.4	62.4	35	82	47
1854	7	59.0	1	68.0	10	60.4	62.5	40	85	45
1855	7	56.8	1	69.4	10	60.5	62.2	39	85	46
1856	7	58.5	1	70.1	7	63.8	64.1	37	81	44
1857	7	57.2	1	67.1	7	61.5	61.9	35	82	47
1858	7	54.3	12	67.3	10	59.8	60.5	32	82	50
1859	7	54.5	12	65.9	10	56.3	58.9	36	74	38
1860	7	57.6	12	66.1	5	64.7	62.8	35	82	47
1861	6	58.5	12	70.0	5	69.2	65.9	44	80	36
1862	7	60.7	12	71.0	5	69.5	67.1	37	79	42
1863	7	56.9	2	67.5	9	60.3	61.6	37	82	45
1864	6	54.6	1.50	68.4	9	59.1	60.7	40	79	39
1865	6	60.5	1.50	73.4	9	64.8	66.2	39	87	48
Mean 45 years,	6.46	56.6	1.37	69.4	9.19	60.9	62.3	27	90	63
Mean 86 years,	6.32	56.4	1.43	70.3	9.11	61.0	62.6	27	92	65

October.

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1778	7	48.9	2	63.6	10	50.3	54.3	30	81	51
1780	7	47.7	2	62.6	10	49.5	53.3	31	71	40
1781	7	46.9	2	62.1	10	49.7	52.9	30	77	47
1782	7	42.5	2	56.1	10	44.7	47.8	26	71	45
1783	7	42.8	2	56.4	10	45.4	48.2	30	70	40
1784	7	43.6	2	57.2	10	46.6	49.1	27	74	47
1785	7	45.1	2	59.7	10	48.4	51.1	25	75	50
1786	7	46.9	2	62.6	10	51.2	53.6	25	80	55
1787	7	40.7	2	55.3	10	44.1	46.7	22	70	48
1788	6.03	46.1	12	58.5	6	53.2	52.6	22	73	51
1789	6.03	41.9	12	53.4	6	49.2	48.2	26	66	40
1790	7	46.6	12	60.3	6	53.8	53.6	28	77	49
1791	7	43.2	12	56.3	6	50.7	50.1	28	76	48
1792	7	47.0	2	62.1	10	50.2	53.1	27	76	49
1793	7	43.4	2	60.4	10	47.1	50.3	21	77	56
1794	7	42.6	2	58.9	10	46.2	49.2	27	71	44
1796	6.50	46.5	1	58.5	6.03	53.3	52.8	33	71	38
1797	6.50	41.9	1	57.3	6.03	50.0	49.7	28	75	47
1798	6.60	47.9	1	62.2	6	55.6	55.2	23	71	48
1799	6.60	45.6	1	59.7	6	53.6	53.0	27	74	47
1800	6.25	45.5	2	59.0	9	54.1	52.9	32	69	37
1801	7.00	45.7	2	60.9	7	55.0	53.9	23	73	50
1802	7.00	50.0	1	64.3	7	55.4	56.6	28	76	48
1803	7.00	48.6	1	62.3	7	57.3	56.1	32	76	44
1804	6.25	46.3	2	58.2	9	49.9	51.5	35	73	38
1805	6.25	42.6	1	60.0	10	46.4	49.7	28	78	50
1806	6.25	43.4	1	64.2	10	47.6	51.7	29	78	49
1807	6.25	46.7	1	62.8	10	49.5	53.0	26	76	50
1808	6.25	44.9	1	60.5	10	47.8	51.1	22	78	56
1809	6.25	52.5	1	69.1	10	55.0	58.9	29	83	54
1810	6.25	41.4	1	60.5	10	45.7	49.2	21	80	59
1811	6.25	51.3	1	62.7	10	54.5	56.2	28	80	52
1812	6.25	44.7	1	59.0	10	49.1	50.9	28	73	45
1813	6.25	47.3	1	54.1	10	49.5	50.3	27	66	39
1814	6.25	43.7	1	60.3	10	47.0	50.3	28	73	45
1815	6.25	42.7	1	57.7	10	46.6	49.0	26	78	52
1816	6.25	45.0	1	59.7	10	49.0	51.2	28	69	41
1817	6.25	41.1	1	56.0	10	44.1	47.1	26	69	43
1818	6.25	41.4	1	58.8	10	47.1	49.1	28	69	41
1819	6.25	42.9	1	57.9	10	47.2	49.3	26	77	51
1820	6.25	44.9	1	57.3	10	47.1	49.8	25	70	45
Mean 41 years,	6.58	45.1	1.27	59.7	8.95	49.7	51.5	21	83	62

October (continued).

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max	Range.
1821	6.25	43.7	2	58.0	10	48.2	50.0	28	74	46
1822	6.25	46.2	1	60.2	10	51.6	52.7	28	76	48
1823	6.25	41.6	12	57.1	10	47.4	48.7	26	76	50
1824	7.00	44.6	1	59.7	10	49.7	51.3	20	74	54
1825	7.00	46.9	1	64.0	10	52.3	54.4	25	80	55
1826	6.25	47.2	1	59.7	10	50.9	52.6	26	73	47
1827	6.25	51.6	2	60.9	10	54.8	55.8	29	71	42
1828	5.50	42.5	2.50	57.6	9	49.9	50.0	22	72	50
1829	6.25	41.3	2	56.3	9	47.5	48.4	23	67	44
1830	6.25	45.3	2	62.0	9	51.1	52.8	29	72	43
1831	7	45.9	1	59.4	10	53.0	52.8	30	69	39
1832	7	46.4	1	56.1	10	48.4	50.3	25	66	41
1833	7	44.4	1	55.3	10	47.7	49.1	20	69	49
1834	7	42.2	1	55.4	10	46.3	48.0	24	75	51
1835	7	46.4	1	59.2	10	49.3	51.6	28	66	38
1836	7	37.4	1	51.2	10	43.0	43.9	19	70	51
1837	6.28	43.6	2	56.7	9.89	48.6	49.6	25	73	48
1838	7	42.9	1	54.4	10	45.0	47.4	21	71	50
1839	6	45.2	1	61.0	9	50.5	52.2	26	72	46
1840	6	46.2	1	58.5	9	50.2	51.6	28	72	44
1841	6.08	40.7	2.03	56.2	10	44.9	47.3	29	68	39
1842	7	42.5	1.00	57.8	10	46.8	49.0	29	68	39
1843	7	42.9	1.00	54.5	10	46.0	47.8	27	72	45
1844	6.14	46.1	1.73	58.4	9	49.6	51.4	30	72	42
1845	6.03	45.5	1.90	61.1	9.02	51.0	52.5	21	75	54
1846	7	43.3	1.96	58.7	9.10	50.7	50.9	24	76	52
1847	7	41.7	1.98	57.5	9.06	46.0	48.4	20	67	47
1848	6.90	47.3	2.29	56.2	8.86	48.8	50.8	31	71	40
1849	7	45.8	2	57.2	8.88	49.4	50.8	31	66	35
1850	7	47.0	1	56.3	10	48.9	50.7	25	66	41
1851	6.56	47.6	2.19	61.5	9.82	52.8	54.0	30	75	45
1852	7	48.4	1	57.7	10	51.5	52.5	30	69	39
1853	7	44.2	1	56.9	10	46.5	49.2	27	66	39
1854	7	48.4	1	60.4	10	51.1	53.3	20	72	52
1855	7	47.6	1	56.8	10	48.8	51.1	31	71	40
1856	7	45.2	1	59.1	7	51.3	51.9	29	74	45
1857	7	47.5	1	58.7	7	51.8	52.7	30	70	40
1858	7	45.5	12	60.4	10	52.6	52.8	26	83	57
1859	6	42.9	12	53.9	5	51.9	49.6	29	69	40
1860	7	48.8	12	57.4	5	56.0	54.1	33	70	37
1861	6	51.2	12	61.9	5	60.4	57.8	26	78	52
1862	7	50.4	12	58.8	5	57.8	55.7	25	81	56
1863	7	48.0	2	59.9	9	52.3	53.4	25	75	50
1864	6.50	44.6	1.53	58.3	9	49.3	50.7	30	73	43
1865	7	43.8	1.50	56.9	9	47.0	49.2	26	80	54
Mean 45 years,	6.66	45.3	1.24	58.1	9.10	50.0	51.1	19	83	64
Mean 86 years,	6.62	45.2	1.26	58.9	9.03	49.9	51.3	19	83	64

November.

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1778	7	31.7	2	42.6	10	34.9	36.4	13	58	45
1780	7	34.3	2	44.0	10	36.3	38.2	20	52	32
1781	7	33.0	2	43.9	10	36.0	37.6	21	63	42
1782	7	33.5	2	44.0	10	36.4	38.0	16	55	39
1783	7	32.2	2	42.0	10	34.3	36.2	10	64	54
1784	7	38.6	2	50.2	10	41.4	43.4	26	60	34
1785	7	35.6	2	46.9	10	38.5	40.3	19	61	42
1786	7	31.4	2	42.4	10	34.7	36.2	2	62	60
1787	7	36.0	2	50.6	10	41.2	42.6	17	63	46
1788	7	42.8	12	51.4	5.57	47.9	47.4	20	74	54
1789	7	38.9	12	48.5	5.57	44.8	44.1	22	60	38
1790	7	36.8	12	46.2	5	42.2	41.7	21	63	42
1791	7	35.6	12	46.3	5	42.3	41.4	20	62	42
1792	7	35.6	2	46.9	10	39.4	40.6	16	63	47
1793	7	35.8	2	47.1	10	39.1	40.7	20	66	46
1794	7	33.1	2	46.9	10	38.4	39.5	15	70	55
1796	7	35.5	1	44.8	5.33	41.0	40.4	18	57	39
1797	7	31.9	1	41.3	5.33	36.9	36.7	14	68	54
1798	7	32.2	1	41.7	5.52	36.6	36.8	12	56	44
1799	7	35.3	1	48.5	5.52	42.0	41.9	18	64	46
1800	6.83	32.6	2	44.1	9	38.2	38.3	16	61	45
1801	6.83	36.5	2.50	48.7	9	38.8	41.3	14	69	55
1802	6.83	35.7	1	50.4	9	40.3	42.1	23	65	42
1803	7.00	33.2	1	45.1	6.38	40.9	39.7	20	61	41
1804	6.83	37.8	1	48.8	9	41.4	42.7	24	65	41
1805	6.83	36.3	1	50.7	10	38.9	42.0	24	74	50
1806	6.83	36.6	1	50.0	10	38.9	41.8	24	62	38
1807	6.83	32.7	1	46.5	10	36.0	38.4	18	59	41
1808	6.83	37.2	1	50.8	10	40.2	42.7	18	68	50
1809	6.83	31.9	1	45.7	10	33.9	37.2	10	69	59
1810	6.83	34.7	1	45.7	10	36.6	39.0	14	59	45
1811	6.83	36.7	1	48.2	10	39.0	41.3	17	62	45
1812	6.83	35.7	1	46.7	10	36.5	39.6	20	68	48
1813	6.83	37.5	1	47.2	10	41.8	42.2	23	67	44
1814	6.83	35.7	1	45.6	10	39.7	40.3	20	60	40
1815	6.83	37.0	1	47.2	10	39.6	41.3	18	60	42
1816	6.83	39.0	1	48.9	10	41.9	43.3	22	65	43
1817	6.83	36.6	1	48.3	10	39.7	41.5	18	66	48
1818	6.83	38.7	1	48.9	10	41.1	42.9	27	63	36
1819	6.83	37.8	1	48.6	10	40.8	42.4	16	66	50
1820	6.83	31.5	1	43.3	10	34.1	36.3	15	57	42
Mean 41 years,	6.92	35.4	1.26	46.7	8.91	39.1	40.4	2	74	72

November (continued).

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max	Range.
1821	6.83	36.6	2	45.4	10	37.7	39.9	22	68	46
1822	6.83	39.8	1	50.6	10	42.3	44.2	20	64	44
1823	6.83	32.0	1	42.6	10	34.4	36.3	16	58	42
1824	7	36.2	1	46.7	10	39.2	40.7	18	61	43
1825	7	36.4	1	46.0	10	38.5	40.3	14	65	51
1826	6.83	36.0	2	47.6	10	39.2	40.9	20	61	41
1827	6.83	32.2	2	41.7	10	34.7	36.2	16	60	44
1828	6.00	37.3	2	49.3	9	42.7	43.1	18	67	49
1829	6.83	36.9	2	46.3	9	39.6	40.9	19	62	43
1830	6.83	44.5	2	53.8	9	46.5	48.3	25	66	41
1831	7	36.7	1	46.2	10	38.7	40.5	22	55	33
1832	7	36.9	1	47.7	10	39.1	41.2	14	63	49
1833	7	31.7	1	44.7	10	35.3	37.2	14	64	50
1834	7	34.0	1	43.9	10	38.9	38.9	20	56	36
1835	7	36.0	1	45.6	10	39.2	40.3	9	64	55
1836	7	30.8	1	42.5	10	35.5	36.3	12	60	48
1837	6.98	33.5	2	43.2	10	35.5	37.4	3	65	62
1838	7.00	30.4	1	41.7	10	33.8	35.3	4	62	58
1839	6.70	32.7	1	43.1	9	35.9	37.2	15	64	49
1840	6.47	36.4	1	45.5	9	39.0	40.3	24	57	33
1841	6.20	34.5	2	45.9	10.07	37.3	39.2	20	65	45
1842	7.00	31.3	1	43.1	10	35.8	36.7	14	61	47
1843	7.00	31.8	1	42.1	10	34.6	36.2	15	64	49
1844	6.83	34.4	1.89	47.2	9.04	39.0	40.2	16	60	44
1845	6.97	38.7	1.93	51.6	9.00	42.1	44.1	11	67	56
1846	7	41.7	1.97	50.5	9.00	44.3	45.5	20	68	48
1847	7	40.1	1.98	52.0	9.01	42.3	44.8	6	71	65
1848	7	31.0	2.07	45.0	9.02	34.7	36.9	13	59	46
1849	7	41.1	1.99	53.9	9.00	44.5	46.5	24	65	41
1850	7	38.3	2.05	50.8	9.05	41.0	43.4	20	64	44
1851	6.94	33.4	2.10	44.7	9.73	37.4	38.5	19	59	40
1852	7	37.6	1	44.0	10	40.0	40.5	24	59	35
1853	7	39.6	1	48.7	10	41.1	43.1	18	66	48
1854	7	37.9	1	46.8	10	40.9	41.9	22	67	45
1855	7	38.7	1	46.8	10	41.5	42.3	21	60	39
1856	7	34.8	1	48.4	7	41.7	41.6	19	64	45
1857	7.64	38.0	1.64	48.8	7.69	41.9	42.9	13	69	56
1858	7	31.5	12	42.6	10	37.2	37.1	14	62	48
1859	7	38.2	12	47.3	5	45.2	43.6	25	64	39
1860	7	40.0	12	48.0	5	45.9	44.6	16	71	55
1861	7	35.7	12	44.8	5	44.1	41.5	24	63	39
1862	7	39.0	2	47.8	9	43.4	43.4	20	64	44
1863	7	39.5	2	50.1	9	44.9	44.8	23	64	41
1864	7	36.9	1.53	47.8	9	40.6	41.8	18	69	51
Mean 44 years,	6.92	36.2	1.34	46.7	9.20	39.7	40.8	3	71	68
Mean 85 years,	6.92	35.8	1.30	46.7	9.05	39.4	40.6	2	74	72

December.

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1778	7	23.5	2	35.3	10	27.2	28.7	-4	55	59
1780	7	29.0	2	38.1	10	30.1	32.4	6	50	44
1781	7	27.2	2	37.4	10	30.3	31.6	8	50	42
1782	7	28.6	2	36.2	10	28.6	31.1	9	59	50
1783	7	25.6	2	35.8	10	28.1	29.8	6	57	51
1784	7	24.1	2	36.5	10	27.0	29.2	-2	53	55
1785	7	26.9	2	37.1	10	29.9	31.3	5	56	51
1786	7	20.0	2	32.6	10	25.8	26.1	-7	46	53
1787	7	26.5	2	38.2	10	29.3	31.3	12	55	43
1788	7	24.3	2	36.3	10	28.2	29.6	-6	54	60
1789	7.45	31.7	12	40.2	5.19	36.8	36.2	16	54	38
1790	7.00	17.9	2	29.2	10	20.8	22.6	-8	45	53
1791	7.50	26.9	12	37.1	5	31.7	31.9	8	49	41
1792	7	24.2	2	35.0	10	27.3	28.8	9	47	38
1793	7	26.4	2	36.5	10	29.0	30.6	3	50	47
1794	7	33.2	2	44.5	10	36.9	38.2	18	59	41
1796	7	20.5	1	31.5	5	27.7	26.6	-6	49	55
1797	7	20.6	1	30.5	5	26.6	25.9	1	51	50
1798	7	19.3	1	29.8	5	24.9	24.7	-3	49	52
1799	7	26.6	1	36.1	5	31.2	31.3	9	45	36
1800	7	30.5	2	39.7	5.67	35.4	35.2	8	61	53
1801	7	29.7	2	43.6	9	32.1	35.1	10	57	47
1802	7	28.1	12	37.9	9	27.3	31.1	1	59	58
1803	7	34.1	1	41.6	5	37.7	37.8	13	60	47
1804	7.30	24.6	1	33.6	10	26.1	28.1	-1	54	55
1805	7.30	35.2	1	47.5	10	36.2	39.6	20	61	41
1806	7.30	26.5	1	38.8	10	27.7	31.0	7	52	45
1807	7.30	33.0	1	45.3	10	34.2	37.5	22	56	34
1808	7.30	30.4	1	40.4	10	32.0	34.3	7	57	50
1809	7.30	31.5	1	44.4	10	34.1	36.7	4	68	64
1810	7.30	26.5	2	38.9	10	29.0	31.5	10	49	39
1811	7.30	25.0	1	37.0	10	29.0	30.3	0	56	56
1812	7.30	26.5	1	36.3	10	29.0	30.6	9	52	43
1813	7.30	26.8	1	34.6	10	28.6	30.0	11	48	37
1814	7.30	23.9	1	33.9	10	26.7	28.2	6	49	43
1815	7.30	24.8	1	34.3	10	27.4	28.8	10	50	40
1816	7.30	25.5	1	36.4	10	30.0	30.6	10	56	46
1817	7.30	26.8	1	35.6	10	29.5	30.6	3	52	49
1818	7.30	19.6	1	32.6	10	24.7	25.6	0	47	47
1819	7.30	26.1	1	36.0	10	29.2	30.4	8	55	47
1820	7.30	24.3	1	32.8	10	26.8	28.0	7	45	38
Mean 41 years,	7.15	26.4	1.34	37.0	9.00	29.5	31.0	-8	68	76

December (continued).

Year.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Min.	Max.	Range.
1821	7.30	24.2	2	33.1	10	27.9	28.4	4	46	42
1822	7.30	28.0	1	35.9	10	28.8	30.9	6	63	57
1823	7.30	29.3	1	38.0	10	31.3	32.9	6	52	46
1824	7	33.6	1	40.3	10	33.9	35.9	14	54	40
1825	7	25.9	1	35.7	10	28.5	30.0	-10	50	60
1826	7.30	27.1	2	36.7	10	30.5	31.4	2	55	53
1827	7.30	31.3	2	39.0	10	32.2	34.2	8	55	47
1828	6.00	31.7	2	42.2	9	34.7	36.2	1	60	59
1829	6.00	34.7	2	43.7	9	37.3	38.6	12	61	49
1830	7.30	31.3	12	39.8	9	32.2	34.4	5	55	50
1831	7	12.3	1	24.3	10	15.5	17.4	-11	44	55
1832	7	28.1	1	36.2	10	30.8	31.7	11	49	38
1833	7	27.8	1	34.2	10	30.3	30.8	9	46	37
1834	7	25.3	1	33.0	10	26.9	28.4	-6	56	62
1835	7	19.1	1	28.1	10	23.2	23.5	-9	43	52
1836	7	24.4	1	33.1	10	26.1	27.9	-1	51	52
1837	7	26.1	2	35.0	10	28.1	29.7	4	60	56
1838	7	21.2	1.04	32.6	9.03	25.3	26.4	2	48	46
1839	7	28.3	1	36.5	9	30.2	31.7	5	55	50
1840	6	24.9	2	36.0	10	27.9	29.6	4	53	49
1841	6.53	29.9	2.08	39.8	10.06	33.3	34.3	6	59	53
1842	7	24.3	1	31.5	10	25.6	27.1	10	45	35
1843	7	25.9	1	33.8	10	27.5	29.1	4	45	41
1844	7.02	24.5	1.87	37.4	9.08	28.8	30.2	0	53	53
1845	7.15	21.0	1.88	31.5	8.96	23.3	25.3	1	52	51
1846	7	24.1	1.98	35.0	9	28.3	29.1	6	56	50
1847	7	31.9	1.97	42.6	9	35.0	36.5	1	63	62
1848	7	32.6	2.00	41.7	9.01	34.4	36.2	3	56	53
1849	7	26.3	2.02	36.4	9	29.4	30.7	6	51	45
1850	7	23.9	1.98	35.1	9	27.2	28.7	4	52	48
1851	7	19.5	1.99	31.2	9.01	23.9	24.9	-5	51	56
1852	7	34.9	1	44.9	10	37.8	39.2	16	55	39
1853	7	27.0	1	37.4	10	29.6	31.3	3	50	47
1854	7	23.7	1	31.1	10	25.4	26.7	3	47	44
1855	7	30.9	1	37.8	10	32.2	33.6	9	56	47
1856	7	23.7	1	31.6	7	28.1	27.8	-2	51	53
1857	7.71	33.0	1.74	41.0	8.36	34.3	36.1	8	57	49
1858	7	24.7	12	35.6	10	31.7	30.7	6	56	50
1859	7	23.9	12	30.6	5	28.0	27.5	-4	60	64
1860	7	23.4	12	29.3	5	28.3	27.0	5	42	37
1861	7	28.3	12	37.1	5	35.3	33.6	8	55	47
1862	7	29.3	2	36.4	9	30.7	32.1	0	57	57
1863	7	23.4	2	34.9	9	30.1	29.5	3	55	52
1864	7	25.3	1.51	35.0	9	28.3	29.5	-6	55	61
Mean 44 years,	6.98	26.6	1.32	35.7	9.19	29.5	30.6	-11	63	74
Mean 85 years,	7.07	26.5	1.33	36.3	9.09	29.5	30.8	-11	68	79

The following table shows the mean temperature of each month of the year as deduced from all the preceding observations. Column 9th shows the mean temperature of each month corrected by the table on page 199, after having received the modifications hereafter explained.

	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Mean.	Correct'd Mean.	Min.	Max.	Range.
January,	7.31	22.3	1.33	32.7	9.00	25.6	26.8	26.66	-24	64	88
February,	7.09	23.1	1.31	34.7	9.03	27.2	28.3	28.18	-16	68	84
March,	6.69	30.8	1.29	43.2	9.02	34.7	36.2	36.21	-9	76	85
April,	6.24	40.6	1.41	54.8	9.14	45.1	46.9	47.13	11	85	74
May,	5.92	51.2	1.46	65.5	9.24	55.2	57.3	57.65	27	94	67
June,	5.88	61.1	1.53	75.1	9.24	65.1	67.1	67.24	35	102	67
July,	5.95	66.0	1.56	79.3	9.24	70.0	71.8	71.95	44	101	57
August,	6.07	64.5	1.56	77.8	9.15	68.8	70.4	70.51	39	98	59
September,	6.32	56.4	1.43	70.3	9.11	61.0	62.6	62.70	27	92	65
October,	6.62	45.2	1.26	58.9	9.03	49.9	51.3	51.26	19	83	64
November,	6.92	35.8	1.30	46.7	9.05	39.4	40.6	40.33	2	74	72
December,	7.07	26.5	1.33	36.3	9.09	29.5	30.8	30.47	-11	68	79
Year,	6.51	43.6	1.40	56.3	9.11	47.6	49.2	49.19	-24	102	126

We next endeavored to determine how these results might be employed to correct the assumed table of the mean diurnal change of temperature given on page 199. The numbers of that table for each month were set off as ordinates corresponding to the hours as abscissas, and a curve as nearly symmetrical as possible, was drawn through the extremities of these ordinates. Then taking the results for January, given above, the morning temperature was subtracted from the mean of the month, and this difference was set off as an ordinate upon the January curve, by which means we determined one point of the true diurnal curve for that month. In like manner, the mid-day and the evening observations determined two other points of this curve. In the same manner, three points were determined in the diurnal curve for each of the other months of the year. The points thus determined corresponded so well with the assumed table on page 199, that we were encouraged to make a further attempt to determine the true diurnal curve for New Haven. We therefore commenced anew a reduction of all the journals which embraced observations made at not less than five hours of each day. These observations embraced a period of nine years, and the hours of observation were generally about 6 and 10 A. M., 2, 6, and 9 P. M. The following tables show the results of these observations.

January.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1841	6.60	27.53	9.92	31.23	2	34.93	6.06	32.42	10	30.97
1842	6.96	27.30	10	34.05	2.05	38.00	5.95	34.11	10	32.38
1845	7.02	26.16	10.03	31.97	1.87	36.84	4.62	33.77	9.14	28.03
1846	7.22	24.39	10	30.43	1.92	35.77	4.71	32.16	9.06	27.68
1847	7	24.00	10	29.13	1.95	34.23	5	31.55	9	26.61
1848	7	26.61	10	32.35	2	37.10	5	33.87	9	29.84
1849	7	17.55	9.98	24.68	2.01	29.74	5.02	25.26	9.02	21.74
1850	7	25.84	9.99	32.03	2	37.10	5	32.94	9	29.10
1851	7	24.71	9.91	31.45	2.04	36.90	5.05	31.35	9	26.84
1852	7	18.77	10	25.42	2	31.00	5.04	25.94	9.06	20.90
Mean,	6.98	24.29	9.98	30.27	1.98	35.16	5.15	31.34	9.23	27.41

February.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1838	6.59	18.93	9.63	24.50	1.93	27.70	6	25.89	10.26	23.19
1841	6.18	20.89	9.97	29.37	2	34.82	6.07	28.78	10.41	24.32
1842	6.79	31.46	10.04	38.32	2	43.81	6.04	38.07	10	34.50
1844	6.99	24.91	10.22	34.05	1	39.10	4.57	36.77	9.31	30.32
1845	7	21.43	9.97	30.61	1.88	37.64	4.98	33.71	9.13	26.75
1846	7	18.71	10	26.25	1.92	32.75	5	28.18	9.09	22.18
1847	7	21.82	10	29.61	1.97	35.61	5	32.07	9.01	27.00
1848	7	20.66	10	31.04	2	36.07	5	32.21	9	25.21
1849	7	14.57	10	25.46	1.98	31.29	5.03	26.81	9	21.29
1850	7	25.75	9.98	34.25	2	40.04	5.04	36.00	9	30.14
1851	7	26.54	9.97	34.14	2	39.07	5.07	35.18	9	30.29
1852	7	22.97	10	32.03	2.02	36.52	5.07	32.38	8.96	27.50
Mean,	6.88	22.39	9.98	30.80	1.89	36.20	5.24	32.17	9.35	26.89

March.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1838	6.29	34.32	9.90	42.61	1.97	44.55	5.90	42.77	10.42	37.97
1841	6.06	31.58	9.97	38.07	2.00	44.30	6	40.07	10.30	35.87
1842	6.63	37.10	9.97	45.77	2.03	51.14	6	45.52	10	40.27
1844	6.65	35.90	10.41	42.00	1.07	45.97	4.91	43.32	9.07	37.35
1845	6.98	32.23	9.90	42.29	1.98	50.32	5.06	45.90	9.11	37.00
1846	7	31.68	9.94	41.97	1.92	48.42	5	44.45	9	35.84
1847	7	26.58	9.91	35.74	1.97	41.58	5.01	38.39	9	30.87
1848	7	27.74	9.97	38.16	1.98	42.00	5.01	38.84	9	31.84
1849	7	32.81	10.00	41.29	2.01	44.52	5	41.81	9	36.58
1850	7	29.84	9.91	39.16	1.99	43.77	5.02	40.00	9	33.23
1851	7	32.32	9.94	42.84	1.93	46.53	5.38	43.19	9.03	36.68
1852	7	30.13	9.93	39.27	1.98	42.93	5.02	38.83	9.01	33.60
Mean,	6.80	31.85	9.98	40.76	1.90	45.50	5.28	41.92	9.33	35.59

April.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1838	6.22	38.00	9.96	47.00	2.04	49.35	6.09	46.68	10.52	41.48
1841	6.13	39.20	9.96	45.21	2.07	50.66	6.05	47.61	10.20	42.59
1842	6.00	42.73	10.00	52.27	2.00	58.64	5.81	53.81	10.00	47.00
1844	6.06	45.97	10.46	57.83	1.20	64.20	5.59	59.97	9.03	51.40
1845	6.05	40.33	10.04	52.80	1.96	58.53	5.24	54.27	9.03	45.10
1846	6.20	39.83	9.57	52.90	1.98	59.93	5.73	55.53	9.02	47.73
1847	6	36.00	9.99	48.03	1.89	54.83	6.04	49.43	9.34	42.37
1848	6	38.80	9.99	52.83	1.97	55.60	6.00	51.90	9.02	44.17
1849	6	37.80	9.98	50.03	2.00	52.37	5.87	48.90	8.93	42.17
1851	6	40.17	9.98	51.83	1.98	53.90	6.01	50.27	9.01	45.00
Mean,	6.07	39.88	9.99	51.07	1.91	55.80	5.84	51.84	9.41	44.90

May.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1841	6	49.17	10.10	58.38	2.31	61.44	5.89	61.84	9.96	52.56
1842	6.05	49.60	10.07	58.36	2.20	61.80	6.18	61.06	10.00	54.41
1844	5.73	54.87	10.36	66.26	1.86	71.10	5.89	66.85	9.13	60.71
1845	6	49.94	10.02	63.39	1.95	70.10	5.89	62.87	9.05	54.87
1846	6	52.94	9.94	62.68	1.93	67.45	6	63.10	9.00	57.23
1847	6.12	50.00	10.00	63.39	1.73	67.58	6.03	62.35	9.76	54.00
1848	6	54.81	9.91	63.10	1.97	66.65	6	64.48	8.98	58.29
1849	6	48.87	9.60	60.03	1.97	62.68	6	58.81	9.09	52.42
Mean,	5.99	51.27	10.00	61.95	1.99	66.10	5.98	62.67	9.37	55.56

June.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1838	6.03	64.07	9.73	75.37	1.79	76.11	5.67	73.20	10.38	66.45
1841	6	65.00	10.07	73.41	2.07	77.43	6.31	74.10	10.12	68.03
1842	5.86	58.89	9.89	67.61	2.07	72.32	6.00	70.14	10.04	62.61
1844	6.01	61.83	10.06	72.63	2.03	74.83	6.07	70.86	9.02	66.47
1845	6	59.33	9.98	73.23	2.03	79.13	5.98	74.67	9.08	64.90
1846	6	59.67	9.92	70.57	2.04	75.10	5.98	70.60	9.07	63.60
1847	6.17	60.20	10.00	72.13	1.78	76.33	6.15	70.14	10.29	63.30
1848	6	61.40	9.85	71.77	2.03	75.83	6.03	72.83	9.06	65.10
1849	6.25	61.43	9.83	71.72	1.72	76.05	6.25	72.83	9.81	65.63
Mean,	6.04	61.31	9.93	72.05	1.95	75.90	6.05	72.15	9.65	65.12

July.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1838	6.21	68.05	9.84	78.16	1.96	80.80	6.00	78.33	10.33	71.71
1841	6	65.77	10.04	74.92	2.04	79.32	6.12	76.32	10.06	69.85
1842	6	69.03	9.97	74.77	2.03	78.20	6.13	75.58	10.02	71.06
1844	6.01	66.32	9.94	75.16	1.95	77.74	6.02	74.87	9.32	69.71
1845	6	64.42	9.92	76.94	1.99	83.13	6.00	78.68	9.05	71.06
1846	6	66.35	9.97	74.81	2.04	79.52	6.01	76.35	9.02	70.52
1847	6.27	67.65	10.02	80.38	1.81	84.47	6.10	77.40	10.21	70.52
1848	6	65.26	9.91	74.16	2.00	77.45	6.04	74.77	9.00	68.74
1849	6.12	65.77	9.87	74.95	1.85	79.55	6.14	76.10	9.44	69.26
Mean,	6.07	66.51	9.94	76.03	1.96	80.02	6.06	76.49	9.61	70.27

August.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1841	6	66.29	9.94	73.83	2.39	78.83	6.16	76.00	10	71.30
1842	6.15	64.40	10.00	69.92	2.02	76.36	6.15	73.31	10	67.93
1844	6.01	64.52	9.91	75.00	1.89	77.84	6	75.26	9	70.10
1845	6	66.19	9.90	76.13	2	82.29	6.01	77.84	9.05	71.87
1846	6	64.77	9.86	73.90	2	79.32	6	75.19	9.02	70.16
1847	6.22	63.94	10.04	75.00	1.93	78.60	6.02	73.71	9.75	67.53
1848	6	63.16	10.02	75.55	2	79.01	6	76.13	9	68.81
1849	6	63.94	10.00	75.35	2	78.26	6	74.43	9	69.23
Mean,	6.05	64.65	9.96	74.33	2.03	78.81	6.04	75.23	9.35	69.62

September.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1844	6.11	56.37	9.93	68.66	1.91	73.17	5.72	69.50	9	62.70
1845	6	54.53	9.80	64.47	1.98	69.77	5.80	66.23	9.03	60.50
1846	6	59.63	9.97	70.67	2	75.73	6	71.03	9.02	65.23
1847	6	56.23	10.02	64.93	2	68.83	6.03	64.93	9.08	59.77
1849	6	53.73	10	65.26	1.97	69.87	6.02	65.90	9.12	59.73
Mean,	6.02	56.10	9.94	66.80	1.97	71.47	5.91	67.52	9.05	61.59

October.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1841	6.08	40.68	9.96	51.57	2.03	56.23	6.03	49.43	10	44.94
1844	6.14	46.06	9.66	54.14	1.73	58.37	5.08	54.63	9	49.65
1845	6.03	45.45	9.85	54.90	1.90	61.10	5.19	57.84	9.02	50.97
1846	7	43.26	10	53.00	1.96	58.68	5	56.48	9.10	50.74
1847	7	41.74	10	52.42	1.98	57.55	5	53.92	9.06	46.00
1848	6.90	47.32	10.11	54.96	2.29	56.24	5	52.67	8.86	48.84
1849	7	45.81	10	52.65	2.00	57.16	5	54.26	8.88	49.42
Mean,	6.59	44.33	9.94	53.38	1.98	57.90	5.19	54.18	9.13	48.65

November.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1841	6.20	34.50	10	41.52	2	45.87	6	40.57	10.07	37.33
1844	6.83	34.37	10.03	41.10	1.89	47.20	4.66	43.97	9.04	38.97
1845	6.97	38.73	10.03	47.10	1.93	51.57	4.52	47.93	9	42.13
1846	7	41.70	9.97	45.23	1.97	50.50	5.01	47.97	9	44.33
1847	7	40.07	9.98	47.47	1.98	51.97	5.06	46.97	9.01	42.30
1848	7	31.03	10.01	40.63	2.07	44.97	5	39.60	9.02	34.70
1849	7	41.07	10.01	48.87	1.99	53.90	5	49.33	9	44.50
1850	7	38.33	9.98	46.10	2.05	50.83	5	45.77	9.05	41.03
Mean,	6.87	37.47	10.00	44.75	1.98	49.60	5.03	45.26	9.15	40.66

December.

Year.	Hour. A. M.	Temp.	Hour. A. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.	Hour. P. M.	Temp.
1840	6	24.87	10	30.32	2	36.03	6	30.55	10	27.94
1841	6.53	29.87	10.03	36.13	2.08	39.80	6.07	35.00	10.06	33.29
1844	7.02	24.52	9.99	31.57	1.87	37.39	4.46	33.83	9.08	28.81
1845	7.15	21.00	10.02	26.48	1.88	31.48	4.31	28.58	8.96	23.26
1846	7	24.10	10.10	29.90	1.98	34.97	5.02	30.71	9	28.29
1847	7	31.87	9.98	37.77	1.97	42.61	5	38.35	9	35.00
1848	7	32.61	10	37.81	2	41.74	5	37.61	9.01	34.42
1849	7	26.30	9.98	31.94	2.02	36.42	5	31.77	9	29.39
1850	7	23.87	10	30.52	1.98	35.10	5	30.68	9	27.23
1851	7	19.55	10	26.00	1.99	31.23	5	27.10	9.01	23.94
Mean,	6.87	25.86	10.01	31.84	1.98	36.68	5.09	32.42	9.21	29.16

These numbers being set off on the curves previously mentioned, determined five points of the true diurnal curve for New Haven, and indicated that the chief error in the numbers on page 199 consisted in the range of the diurnal motion, and not in the law of the curve. Assuming that the true diurnal curve was similar to that indicated by the numbers on page 199, a curve was drawn through the five points already determined, and as nearly parallel as possible to the one first constructed. The true curve has generally a somewhat greater range than the provisional curve first assumed; but otherwise the two curves bear a close resemblance, and afford a presumption that we have made a near approach to the true curve representing the diurnal change of temperature. The ordinates of these curves have all been carefully measured, and are given in the following Table.

Corrections to be applied to the means of the hours of observation to obtain the true mean temperatures at New Haven.

Hour.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Midnight,	2.22	2.78	3.53	4.44	5.25	5.72	5.08	4.63	4.65	3.98	2.51	2.08	3.91
1	2.58	3.27	4.16	5.19	6.08	6.80	6.01	5.42	5.47	4.74	3.09	2.41	4.60
2	2.96	3.75	4.70	5.83	6.93	7.88	6.77	6.11	6.14	5.39	3.63	2.75	5.24
3	3.30	4.27	5.24	6.44	7.68	8.50	7.32	6.55	6.60	5.96	4.08	3.11	5.75
4	3.67	4.77	5.70	7.00	8.17	8.62	7.43	6.92	7.01	6.43	4.51	3.45	6.14
5	4.04	5.16	6.09	7.19	7.98	7.93	7.13	6.86	7.11	6.73	4.84	3.75	6.23
6	4.31	5.31	6.06	6.81	6.20	5.89	5.89	6.12	6.60	6.57	4.87	3.95	5.71
7	4.40	5.11	4.94	5.04	3.31	3.03	3.50	3.93	4.60	5.26	4.55	3.94	4.30
8	3.88	3.75	2.39	1.92	0.28	-0.07	0.77	1.23	1.66	2.35	3.06	3.23	2.04
9	1.43	0.62	-0.31	-1.14	-2.28	-2.62	-1.64	-1.26	-1.22	-0.44	+0.55	1.07	-0.60
10	-1.44	-2.32	-3.04	-3.78	-4.27	-4.56	-3.71	-3.37	-3.67	-3.30	-2.14	-1.52	-3.09
11	-3.48	-4.06	-4.66	-5.31	-5.70	-5.89	-5.44	-5.20	-5.49	-5.44	-4.08	-3.36	-4.84
Noon,	-5.03	-5.38	-5.93	-6.51	-6.77	-6.90	-6.53	-6.36	-6.68	-6.76	-5.51	-4.90	-6.10
1	-5.91	-6.40	-6.81	-7.37	-7.58	-7.68	-7.23	-7.10	-7.42	-7.57	-6.24	-5.67	-6.91
2	-6.17	-6.76	-7.25	-7.86	-8.02	-8.05	-7.54	-7.43	-7.75	-7.92	-6.44	-5.91	-7.26
3	-5.83	-6.61	-7.16	-7.89	-8.04	-7.98	-7.44	-7.36	-7.64	-7.63	-6.09	-5.39	-7.09
4	-4.81	-5.75	-6.47	-7.44	-7.61	-7.45	-6.93	-6.80	-6.94	-6.60	-4.56	-3.95	-6.28
5	-3.04	-3.91	-4.66	-6.28	-6.46	-6.40	-5.88	-5.62	-5.63	-4.55	-2.84	-2.08	-4.78
6	-1.55	-2.12	-2.54	-3.81	-4.47	-4.32	-3.95	-3.67	-3.83	-2.85	-1.58	-1.02	-2.98
7	-0.43	-0.74	-0.96	-1.35	-1.48	-2.16	-1.98	-1.75	-1.81	-1.28	-0.59	-0.26	-1.23
8	0.41	0.30	0.42	0.60	0.71	+0.08	-0.05	+0.08	+0.08	+0.12	+0.22	+0.40	+0.28
9	1.06	1.08	1.43	1.84	2.21	1.83	1.62	1.62	1.63	1.35	0.85	0.92	1.45
10	1.50	1.71	2.19	2.81	3.42	3.26	2.82	2.73	2.76	2.31	1.40	1.35	2.35
11	1.90	2.27	2.86	3.62	4.35	4.55	4.02	3.77	3.75	3.17	1.96	1.72	3.16

Having obtained the means of reducing observations made at irregular hours to fixed hours, we next undertook a more satisfactory reduction of the entire series of observations embracing 86 years. Taking the January series, we computed from the preceding table, the reduction for each of the morning observations to 7 o'clock, and finding the mean of the whole, we obtained the average temperature at 7 o'clock according to 86 years of observations. Each of the mid-day observations was in like manner reduced to 2 o'clock, and finding the mean of the whole, we obtained the average temperature at 2 o'clock. In the same manner, each of the evening observations was reduced to 9 o'clock, and the mean of the entire series was taken. The observations of each of the other months were in like manner reduced to the nearest even hour.

We next took the series of observations made five times a day, embracing a period of nine years, and reduced each of them in like manner to the nearest even hour. We then took the difference between the averages for the morning and mid-day observations in the long and short series, and applied half the sum of these differences as a correction to the 10 o'clock observation, by which means we obtained the most probable temperature at 10 o'clock corresponding to

to the series of 86 years. The corrected temperature at 5 or 6 o'clock was obtained in a similar manner. We had now three points of the diurnal curve of temperature determined from 86 years of observations; one point being near the hour of minimum temperature, and a second near the hour of maximum temperature; and we had two intermediate points determined from nine years of observations. A curve was then drawn through these five points as nearly as possible parallel to the curve previously determined. The following table shows the resulting temperature obtained for each hour of each month of the year.

Mean temperature of the air at New Haven for each hour of each month of the year.

Hour.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Midnight,	24.26	25.24	32.38	42.19	51.88	61.15	66.46	65.57	57.71	47.02	37.68	28.25	44.98
1	23.91	24.77	31.77	41.41	51.01	60.03	65.49	64.75	56.87	46.26	37.14	27.93	44.28
2	23.53	24.31	31.24	40.74	50.12	58.91	64.69	64.03	56.18	45.62	36.64	27.60	43.63
3	23.19	23.80	30.72	40.10	49.31	58.25	64.11	63.56	55.70	45.05	36.22	27.25	43.10
4	22.83	23.32	30.28	39.52	48.78	58.10	63.97	63.16	55.27	44.59	35.82	26.93	42.71
5	22.46	22.95	29.91	39.31	48.90	58.79	64.27	63.22	55.15	44.29	35.52	26.64	42.62
6	22.19	22.81	30.00	39.69	50.68	60.83	65.51	63.96	55.66	44.45	35.52	26.45	43.15
7	22.15	23.01	31.18	41.57	53.65	63.79	67.98	66.21	57.75	45.83	35.84	26.46	44.62
8	22.71	24.42	33.79	44.80	56.77	66.99	70.80	68.98	60.78	48.81	37.34	27.21	46.95
9	25.20	27.60	36.55	47.96	59.42	69.64	73.30	71.54	63.75	51.68	39.86	29.41	49.66
10	28.12	30.59	39.33	50.71	61.49	71.69	75.45	73.71	66.28	54.62	42.56	32.05	52.22
11	30.16	32.34	40.95	52.33	63.05	73.04	77.23	75.60	68.15	56.75	44.51	33.91	54.00
Noon,	31.72	33.67	42.23	53.62	64.26	74.08	78.37	76.82	69.39	58.05	45.95	35.47	55.30
1	32.60	34.70	43.12	54.58	65.21	74.89	79.12	77.62	70.17	58.85	46.69	36.27	56.15
2	32.87	35.06	43.56	55.16	65.79	75.28	79.47	78.01	70.54	59.18	46.89	36.54	56.53
3	32.41	34.87	43.43	55.19	65.81	75.21	79.37	77.94	70.39	58.81	46.51	35.95	56.32
4	31.26	33.89	42.69	54.67	65.30	74.59	78.85	77.38	69.65	57.70	44.95	34.44	55.45
5	29.37	31.92	40.83	53.44	64.07	73.44	77.79	76.21	68.30	55.57	43.20	32.51	53.89
6	27.92	30.12	38.63	50.85	62.00	71.27	75.84	74.26	66.47	53.86	41.88	31.42	52.05
7	26.84	28.73	36.97	48.31	58.93	69.12	73.69	72.24	64.38	52.28	40.82	30.63	50.24
8	26.04	27.67	35.52	46.23	56.66	66.88	71.77	70.31	62.42	50.88	39.95	29.93	48.69
9	25.42	26.88	34.43	44.86	55.05	65.14	70.01	68.67	60.81	49.64	39.25	29.38	47.46
10	24.98	26.27	33.69	43.87	53.81	63.68	68.78	67.53	59.65	48.68	38.73	28.96	46.55
11	24.58	25.73	33.04	43.04	52.83	62.36	67.55	66.46	58.63	47.82	38.20	28.60	45.74
Monthly means,	26.53	28.11	36.09	46.84	57.28	66.96	71.66	70.32	62.50	51.10	40.32	30.42	49.01

Subtracting each of these numbers from the mean for the month, we obtain the following table showing the corrections to be applied to the means of the hours of observation to obtain the true mean temperatures at New Haven. These numbers indicate a diurnal range of temperature a little greater than that shown by the table on page 229.

At the bottom of the table is given a comparison of some of the different modes which have been proposed for deducing the mean temperature from a limited number of observations.

Corrections to be applied to the means of the hours of observation to obtain the true mean temperature at New Haven. (Adopted.)

Hour.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Midnight,	2.27	2.87	3.71	4.65	5.40	5.81	5.20	4.75	4.79	4.08	2.64	2.17	4.03
1	2.62	3.34	4.32	5.43	6.27	6.93	6.17	5.57	5.63	4.84	3.18	2.49	4.73
2	3.00	3.80	4.85	6.10	7.16	8.05	6.97	6.29	6.32	5.48	3.68	2.82	5.38
3	3.34	4.31	5.37	6.74	7.97	8.71	7.55	6.76	6.80	6.05	4.10	3.17	5.91
4	3.70	4.79	5.81	7.32	8.50	8.86	7.69	7.16	7.23	6.51	4.50	3.49	6.30
5	4.07	5.16	6.18	7.53	8.38	8.17	7.39	7.10	7.35	6.81	4.80	3.78	6.39
6	4.34	5.30	6.09	7.15	6.60	6.13	6.15	6.36	6.84	6.65	4.80	3.97	5.86
7	4.38	5.10	4.91	5.27	3.63	3.17	3.68	4.11	4.75	5.27	4.48	3.96	4.39
8	3.82	3.69	2.30	2.04	0.51	-0.03	0.86	1.34	1.72	2.29	2.98	3.21	2.06
9	1.33	0.51	-0.46	-1.12	-2.14	-2.68	-1.64	-1.22	-1.25	-0.58	0.46	1.01	-0.65
10	-1.59	-2.48	-3.24	-3.87	-4.21	-4.73	-3.79	-3.39	-3.78	-3.52	-2.24	-1.63	-3.21
11	-3.63	-4.23	-4.86	-5.49	-5.77	-6.08	-5.57	-5.28	-5.65	-5.65	-4.19	-3.49	-4.99
Noon,	-5.19	-5.56	-6.14	-6.78	-6.98	-7.12	-6.71	-6.50	-6.89	-6.95	-5.63	-5.05	-6.29
1	-6.07	-6.59	-7.03	-7.74	-7.93	-7.93	-7.46	-7.30	-7.67	-7.75	-6.37	-5.85	-7.14
2	-6.34	-6.95	-7.47	-8.32	-8.51	-8.32	-7.81	-7.69	-8.04	-8.08	-6.57	-6.12	-7.52
3	-5.88	-6.76	-7.34	-8.35	-8.53	-8.25	-7.71	-7.62	-7.89	-7.71	-6.19	-5.53	-7.31
4	-4.73	-5.78	-6.60	-7.83	-8.02	-7.63	-7.19	-7.06	-7.15	-6.60	-4.63	-4.02	-6.44
5	-2.84	-3.81	-4.74	-6.60	-6.79	-6.48	-6.13	-5.89	-5.80	-4.47	-2.88	-2.09	-4.88
6	-1.39	-2.01	-2.54	-4.05	-4.72	-4.31	-4.18	-3.94	-3.97	-2.76	-1.56	-1.00	-3.04
7	-0.31	-0.62	-0.88	-1.47	-1.65	-2.16	-2.03	-1.92	-1.88	-1.18	-0.50	-0.21	-1.23
8	0.49	0.44	0.57	0.61	0.62	0.08	-0.11	0.01	0.08	0.22	0.37	0.49	0.32
9	1.11	1.23	1.66	1.98	2.23	1.82	1.65	1.65	1.69	1.46	1.07	1.04	1.55
10	1.55	1.84	2.40	2.97	3.47	3.28	2.88	2.79	2.85	2.42	1.59	1.46	2.46
11	1.95	2.38	3.05	3.80	4.45	4.60	4.11	3.86	3.87	3.28	2.12	1.82	3.27
Dail. ext.	-0.98	-0.82	-0.64	-0.41	-0.01	+0.27	-0.06	-0.26	-0.34	-0.63	-0.88	-1.07	-0.56
7. 1	-0.84	-0.74	-1.06	-1.23	-2.15	-2.38	-1.89	-1.59	-1.46	-1.24	-0.94	-0.94	-1.37
7. 2	-0.98	-0.92	-1.28	-1.52	-2.44	-2.57	-2.06	-1.79	-1.64	-1.40	-1.04	-1.08	-1.56
8. 1	-1.12	-1.45	-2.36	-2.85	-3.71	-3.98	-3.30	-2.98	-2.97	-2.73	-1.69	-1.32	-2.54
8. 2	-1.26	-1.63	-2.58	-3.14	-4.00	-4.17	-3.47	-3.17	-3.16	-2.89	-1.79	-1.45	-2.73
9. 8	+0.91	+0.47	+0.05	-0.25	-0.76	-1.30	-0.87	-0.60	-0.58	-0.18	+0.41	+0.75	-0.16
6. 6	1.47	1.64	1.77	1.55	0.94	0.91	0.98	1.21	1.43	1.94	1.62	1.48	1.41
7. 7	2.03	2.24	2.01	1.90	0.99	0.50	0.82	1.09	1.43	2.04	1.99	1.87	1.58
8. 8	2.15	2.06	1.43	1.32	0.56	0.02	0.37	0.67	0.90	1.25	1.67	1.85	1.19
9. 9	1.22	0.87	0.60	0.43	0.04	-0.43	.00	0.21	0.22	0.44	0.76	1.02	0.45
10. 10	-0.02	-0.32	-0.42	-0.45	-0.37	-0.72	-0.45	-0.30	-0.46	-0.55	-0.32	-0.08	-0.37
6. 2. 6	-1.13	-1.22	-1.31	-1.74	-2.21	-2.17	-1.95	-1.76	-1.72	-1.40	-1.11	-1.05	-1.57
6. 2. 8	-0.50	-0.40	-0.27	-0.19	-0.43	-0.70	-0.59	-0.44	-0.37	-0.40	-0.47	-0.55	-0.45
6. 2. 9	-0.30	-0.14	+0.09	+0.27	+0.11	-0.12	.00	+0.11	+0.16	+0.01	-0.23	-0.37	-0.04
6. 2. 10	-0.15	+0.06	+0.34	+0.60	+0.52	+0.36	+0.41	+0.49	+0.55	+0.33	-0.06	-0.23	+0.27
7. 2. 9	-0.28	-0.21	-0.30	-0.36	-0.88	-1.11	-0.83	-0.64	-0.53	-0.45	-0.34	-0.37	-0.53
7. 2. 2 (9)	+0.06	+0.15	+0.19	+0.23	-0.10	-0.38	-0.21	-0.07	+0.02	+0.03	+0.01	-0.02	-0.01

During winter, the mean of the two daily extremes gives a temperature almost one degree too great; and for the entire year, the mean of the two daily extremes gives a temperature more than half a degree too great.

If we combine any morning observation with an observation made about the time of greatest heat, we obtain a resulting temperature too great.

Twice during each day, the height of the thermometer coincides with the mean temperature of the day. This coincidence occurs about 15 minutes before nine in the morning, and also about 12 minutes before eight in the evening. We should therefore obtain the mean temperature by a single observation at either of these instants; but a uniform system of observation is more likely to be adhered to, when the time of observation is an even hour. If we combine 9 o'clock in the morning with 8 o'clock in the evening, the resulting temperature will be about a degree too high in summer, and about three-fourths of a degree too low in winter. The mean for the year will be only one-sixth of a degree too great; and this is the nearest approach to the mean temperature which can be obtained by combining any two hours of observation, unless we employ inconvenient hours of the night. In other words, there are no two convenient hours whose mean corresponds with the mean temperature of New Haven with the precision which is desirable in such observations.

If the mean temperature is to be deduced from observations at two hours of the same name, the hours which best combine accuracy with convenience are 10 A. M. and 10 P. M.; but these give a result about one-third of a degree too great.

If observations are made at three hours daily, we shall obtain the mean temperature very accurately by observations at 6 A. M., 2 and 9 P. M.; but during the winter months 6 A. M. is an inconvenient hour, and not likely to be faithfully adhered to. The mean of observations at 7 A. M., 2 and 9 P. M., is too great; but if we add twice the nine o'clock observation to the sum of the other two observations, and divide the result by 4, the error of the result for the separate months in only one instance exceeds a quarter of a degree; and for the entire year differs but one-hundredth of a degree from the true mean temperature. These then are the three hours to be generally recommended for observation, and fortunately they are extremely well adapted to the convenience of most observers.

The annual variation of temperature may be represented by Bessel's well-known formula

$$T_x = (T) + A_1 \sin(x + B_1) + A_2 \sin(2x + B_2) + A_3 \sin(3x + B_3) + \text{etc.},$$

where T_x represents the mean temperature of a day corresponding to an epoch x of the year, x being counted in degrees from some as-

sumed instant; (T), A_1 , B_1 , A_2 , B_2 , etc., being constants derived from the mean temperatures determined for certain epochs. In order that these constants may be most conveniently determined, it is necessary that the epochs should divide the year into equal intervals; and it is also necessary to deduce from the mean temperatures for the several months, the mean temperatures of 12 equidistant epochs; viz., for $x = 0^\circ$, $x = 30^\circ$, and so on up to $x = 330^\circ$.

Now the mean temperature of all the days of a month does not coincide with that of a day placed at the middle of the month, because the temperature does not change uniformly; that is, the variation of temperature is represented by a curved line rather than by a straight line; and when we have obtained the mean temperature for the middle of each month, these temperatures do not correspond to the epochs $x = 0^\circ$, $x = 30^\circ$, etc., because the months are of unequal length. It is therefore necessary to reduce the temperature of the middle of each month to that which corresponds to the epochs 0° , 30° , etc. In order to obtain these two corrections, a provisional formula was computed, which differed but little from the one given below, and from this was computed the mean temperature of each day of the year. The following table shows the corrections thus obtained for the curvature of the line of mean temperature, and for inequality of intervals, the dates being reckoned from Jan. 15th. The last column shows the results after these two corrections have been applied.

Months.	Temperature observed.	Corrections for		Temperature corrected.
		Curvature.	Unequal intervals.	
January,	26.53	-0.24	+0.04	26.33
February,	28.11	-0.31	-0.03	27.77
March,	36.09	-0.11	+0.22	36.20
April,	46.84	+0.05	+0.20	47.09
May,	57.28	0	+0.18	57.46
June,	66.96	+0.25	+0.11	67.32
July,	71.66	+0.26	+0.02	71.94
August,	70.32	+0.31	+0.03	70.66
September,	62.50	+0.18	+0.09	62.77
October,	51.10	-0.07	+0.12	51.15
November,	40.32	+0.02	+0.13	40.47
December,	30.42	-0.31	+0.11	30.22

Computing from these corrected temperatures the values of the constants in our assumed formula, we obtain

$$T_x = 49^\circ.11 + 22^\circ.92 \sin(x + 263^\circ 38') + 0^\circ.29 \sin(2x + 345^\circ 24') \\ + 0^\circ.45 \sin(3x + 229^\circ 50') + 0^\circ.02 \sin(4x + 150^\circ) + 0^\circ.38 \sin(5x + 54^\circ 31') \\ - 0^\circ.08 \cos 6x,$$

in which x is reckoned from January 15th.

From this formula has been computed the mean temperature of each day of the year, as shown in the following table.

Mean temperature of every day in the year, as deduced from 86 years of observations at New Haven, Conn.

Day of the Month.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	27.4	26.4	31.1	41.8	52.1	62.8	70.5	71.9	67.4	56.5	45.5	34.6
2	27.3	26.5	31.4	42.1	52.5	63.1	70.6	71.9	67.1	56.1	45.2	34.3
3	27.2	26.5	31.7	42.5	52.8	63.4	70.8	71.8	66.8	55.7	44.8	33.9
4	27.1	26.6	32.0	42.9	53.1	63.8	70.9	71.7	66.5	55.3	44.5	33.6
5	27.0	26.7	32.3	43.2	53.4	64.1	71.0	71.7	66.2	55.0	44.1	33.3
6	26.9	26.8	32.6	43.6	53.8	64.4	71.1	71.6	65.9	54.6	43.8	32.9
7	26.8	26.9	32.9	43.9	54.1	64.7	71.2	71.5	65.6	54.3	43.4	32.6
8	26.7	27.0	33.2	44.3	54.5	65.1	71.3	71.5	65.3	53.9	43.1	32.3
9	26.6	27.1	33.6	44.6	54.8	65.4	71.4	71.4	65.0	53.5	42.7	32.0
10	26.6	27.2	33.9	45.0	55.2	65.7	71.5	71.3	64.6	53.2	42.3	31.7
11	26.5	27.3	34.2	45.3	55.5	66.0	71.6	71.2	64.3	52.8	42.0	31.4
12	26.5	27.4	34.6	45.7	55.9	66.2	71.7	71.1	64.0	52.5	41.6	31.1
13	26.4	27.6	34.9	46.0	56.2	66.5	71.7	71.0	63.6	52.1	41.3	30.9
14	26.4	27.7	35.3	46.4	56.6	66.8	71.8	70.9	63.3	51.8	40.9	30.6
15	26.3	27.9	35.6	46.7	56.9	67.1	71.8	70.8	62.9	51.4	40.5	30.3
16	26.3	28.0	36.0	47.1	57.3	67.3	71.9	70.6	62.5	51.1	40.2	30.1
17	26.3	28.2	36.3	47.4	57.6	67.6	71.9	70.5	62.1	50.7	39.8	29.8
18	26.3	28.4	36.7	47.8	58.0	67.8	72.0	70.3	61.8	50.4	39.4	29.6
19	26.3	28.6	37.1	48.1	58.3	68.1	72.0	70.2	61.4	50.0	39.1	29.4
20	26.2	28.8	37.4	48.4	58.7	68.3	72.0	70.0	61.0	49.7	38.7	29.2
21	26.2	29.0	37.8	48.7	59.0	68.5	72.1	69.8	60.6	49.3	38.3	29.0
22	26.2	29.2	38.2	49.1	59.4	68.8	72.1	69.6	60.2	49.0	38.0	28.8
23	26.3	29.5	38.5	49.4	59.8	69.0	72.1	69.5	59.8	48.6	37.6	28.6
24	26.3	29.7	38.9	49.7	60.1	69.2	72.1	69.3	59.4	48.3	37.2	28.4
25	26.3	29.9	39.3	50.1	60.4	69.4	72.1	69.1	59.0	47.9	36.8	28.2
26	26.3	30.2	39.6	50.4	60.8	69.6	72.1	68.9	58.6	47.6	36.5	28.1
27	26.3	30.5	40.0	50.7	61.1	69.8	72.1	68.6	58.1	47.2	36.1	27.9
28	26.3	30.8	40.4	51.1	61.4	70.0	72.0	68.4	57.7	46.9	35.8	27.8
29	26.4		40.7	51.4	61.8	70.1	72.0	68.2	57.3	46.6	35.4	27.7
30	26.4		41.1	51.8	62.1	70.3	72.0	67.9	56.9	46.2	35.0	27.6
31	26.4		41.4		62.5		71.9	67.7		45.9		27.5
Means,	26.53	28.11	36.09	46.84	57.28	66.96	71.66	70.32	62.50	51.10	40.32	30.42

From this table we perceive that the coldest day of the year is January 21st or 22d, being 31 days after the winter solstice. The warmest day is July 24th or 25th, being 33 days after the summer solstice. The interval from minimum to maximum is 184 days, and from maximum to minimum is 181. The mean temperature of the year is passed through on April 22d and Oct. 22d, which dates divide the year into two portions almost exactly equal to each other.

The ascending and descending branches of the curve of annual temperature are almost exactly similar to each other, as is indicated by the coefficients in the formula, page 233, each of the coefficients after the second term, being less than half a degree. This symmetry

is doubtless in part the result of the long series of observations by which the influence of irregular causes has been eliminated, and this curve doubtless affords a near approximation to the average climate of New Haven.

The following table shows the highest as well as the lowest temperatures observed for each month of the year, together with the date of the observation and the name of the observer. These observations were generally made at fixed hours, which were not always those of the highest or lowest temperature. In such cases, in order to obtain the true maximum or minimum, a small correction has been applied which was deduced from the table of the diurnal variation given on page 232.

Month.	Max.	Date.		Observers.	Min.	Date.		Observers.	Range.
		Year.	Day.			Year.	Day.		
	°				°				°
Jan.,	64	1833	5	Dr. Alfred S. Monson.	-24	1835	5	{ Dr. Alfred S. Monson, Rodney Burton.	88
Feb.,	68	1810	26	Pres. Jeremiah Day.	-16	1855	7	Rodney Burton.	84
March,	76	1845	28	Col. Enos Cutler.	-9	1835	2	{ Dr. Alfred S. Monson, Rodney Burton.	85
April,	85	1844	15	Col. Enos Cutler.	11	1847	1	Col. Enos Cutler.	74
May,	94	1845	12	Col. Enos Cutler.	27	1837	2	Edward C. Herrick.	67
June,	102	1864	26	Prof. Elias Loomis.	35	{ 1787 1816	{ 2 7	{ Pres. Ezra Stiles, Pres. Jeremiah Day.	{ 67
July,	101	1798	3	Hezekiah Howe.	44	1814	13	Pres. Jeremiah Day.	57
Aug.,	98	{ 1780 1863	{ 6 3	{ Pres. Ezra Stiles, Prof. Elias Loomis.	39	1834	29	Dr. Alfred S. Monson.	59
Sept.,	92	1782	5	Pres. Ezra Stiles.	27	1834	30	Dr. Alfred S. Monson.	65
Oct.,	83	{ 1809 1858	{ 1 4	{ Pres. Jeremiah Day, Rev. David L. Ogden.	19	1836	28	Dr. Alfred S. Monson.	64
Nov.,	74	{ 1788 1805	{ 5 2	{ Pres. Ezra Stiles, Pres. Jeremiah Day.	2	1786	29	Pres. Ezra Stiles.	72
Dec.,	68	1809	26	Pres. Jeremiah Day.	-11	1831	16	Dr. Alfred S. Monson	79
Year,	102	1864		Prof. Elias Loomis.	-24	1835		{ Dr. Alfred S. Monson Rodney Burton.	126

The principal results of the preceding tables are graphically represented by curves on the accompanying plates.

Plate I exhibits the mean daily curve of temperature for each month of the year, and also for the average of the entire year according to the table on page 230. The hours of the day are shown at the top and bottom of the page, and the degrees of temperature upon the right and left margins. The general resemblance of the curves for the different months is quite remarkable; and especially the fact that no two of the curves intersect each other.

Plates II and III exhibit what Major General Sabine designates as chrono-isothermal lines, being designed to show the temperature at the several hours of the day on each day of the year. Plate II exhibits the isothermals which are comprised between the mean temper-

ature of the year and the *highest* isothermal; the two variables being the hour of the day, and the day of the year. The hours of the day are indicated by equidistant vertical lines which are numbered at both top and bottom; while the beginning and middle of each month are indicated by the horizontal lines. The smallest curve on this map shows at what hours and upon what months the mean temperature of New Haven is 78° . The next curve shows at what hours, and upon what months the mean temperature is 76° , and so on. These curves show an unexpected degree of symmetry, which is probably due to the length of the series of observations, by which the influence of irregular causes is mostly eliminated.

Plate III exhibits the isothermals which are comprised between the mean temperature of the year, and the *lowest* isothermal. The smallest curve on this map shows at what hours, and upon what months the mean temperature of New Haven is 22° . The next curve shows at what hours and upon what months the mean temperature is 24° , and so on. These curves are less symmetrical than the preceding, being crowded much more closely together in the morning than in the evening hours; indicating that in winter the temperature changes much more rapidly in the morning than in the evening. An effect of the same kind is noticeable in summer, but is somewhat less conspicuous than in winter.

In order to determine whether the mean temperature of New Haven has changed since the time of the earliest recorded observations, we have divided the entire series of observations into two groups, the first embracing the observations down to 1820, forming a series of 41 years; the second embracing the observations since 1820, forming a series of 45 years. The mean temperature of each month according to the two series of observations is shown in the following table; the mean of the observations being reduced to the true mean temperature by applying the correction from the table on page 232.

Months.	First series.	Second series.	Difference.	Months.	First series.	Second series.	Difference.
January,	26.31	26.73	+0.42	July,	71.70	71.62	-0.08
February,	28.08	28.16	+0.08	August,	70.80	69.88	-0.92
March,	35.80	36.36	+0.56	September,	62.84	62.20	-0.64
April,	47.17	46.53	-0.64	October,	51.28	50.93	-0.35
May,	57.26	57.30	+0.04	November,	40.04	40.59	+0.55
June,	67.47	66.51	-0.96	December,	30.56	30.29	-0.27

These differences are generally small, with repeated changes of sign; which seems to indicate that they are mainly due to those irregular causes which render the mean temperature of a given

month of one year, so unlike that of the same month in some different year.

If we make the comparison by seasons, the numbers are

Seasons.	First series.	Second series.	Difference.
Winter,	28.32	28.39	+0.07
Spring,	46.74	46.73	-0.01
Summer,	69.99	69.34	-0.65
Autumn,	51.39	51.24	-0.15
Year,	49.11	48.93	-0.18

The final result is that the mean temperature of New Haven by the last 45 years, is one-fifth of a degree lower than by the first 41 years; but this quantity does not exceed the probable zero error of most of the thermometers employed in the observations; and we must conclude that if the mean temperature of New Haven has changed at all since 1778, the change amounts to only a small fraction of a degree, and cannot be certainly decided from the observations. It is however, noticeable that the difference for the summer months is quite large, considering the length of the period from which the result is deduced, and seems to indicate a slight moderation in the heat of our summers. A careful examination of the preceding tables will show a remarkable excess of high temperatures for summer at the mid-day observation during the years from 1778 to 1803, from which it is reasonable to conclude that the thermometers of Pres. Stiles and Messrs. Beers and Howe were not as well protected from reflected heat as were the thermometers in most of the subsequent observations. Some influence may be ascribed to the increased number and size of our shade trees, within the last half century, by which means thermometers are generally better sheltered from the rays of the sun reflected from buildings or a sandy soil.

One of the most important features of a climate is its liability to late frosts in spring, and early frosts in autumn. We have endeavored to determine from the journals the average date of these frosts, but it is obvious from an inspection of the records that the frosts in many instances were not recorded. It is thought that we may obtain more reliable data for comparison, if we fix upon a certain temperature as indicated by the observations of the thermometer. We have therefore selected from the journals for each year the last instance before midsummer, in which the thermometer sunk as low as 40°, and whenever mention is made of a frost at that date, the record is copied in the following table. We have also selected from the journals for each year, the first date after midsummer in which the thermom-

eter sunk as low as 40°, and whenever mention is made of a frost at the same date the record is copied in the following table. It is presumed that in nearly every one of these instances, a slight frost must have occurred in low and exposed places.

LAST FROST OF SPRING.				FIRST FROST OF AUTUMN.			
Years.	Date.	Temp.		Date.	Temp.		
1778		°		September 4	39		
1779	May 6	40		September 26	37		
1780	May 20	40		October 3	37	Ice.	
1781	May 26	40		October 4	38		
1782	May 5	38					
1783	May 20	39		September 2	40		
1784	May 18	37		September 15	34	Ice ¼ inch thick.	
1785	May 11	38	Frost.	September 30	40		
1786	May 18	39		September 14	40	Frost.	
1787	June 2	35		September 16	37		
1788	May 11	35		September 21	39		
1789	May 27	38	Frost.	September 19	40	Frost.	
1790	May 17	40		September 24	36	Frost.	
1791	May 14	40		September 18	40	Frost.	
1792	May 18	34	Frost.	September 1	37	Ice.	
1793	May 16	39	Frost.	September 18	37	Ice.	
1794	May 18	40	Frost.	September 21	40	Frost.	
1796	May 9	40		October 8	37		
1797	May 15	37	Frost.	September 20	40		
1798	May 19	40		September 29	39	Frost.	
1799	May 12	35	Snow squalls.	October 1	39	Frost.	
1800	May 10	40		October 4	39		
1801	May 15	40		September 12	40	Frost.	
1802	May 21	40		September 25	40	Frost.	
1803	May 13	40		September 28	40		
1804	May 14	39		September 30	34	Frost and ice.	
1805	May 31	39		September 24	40		
1806	June 4	40	Frost.	September 11	39	Frost.	
1807	May 18	40		October 6	36	Hard frost.	
1808	May 23	40	Frost.	September 22	32	White frost.	
1809	May 9	40		September 7	40	White frost.	
1810	May 22	39	Frost.	September 17	40		
1811	May 31	40		September 22	40		
1812	May 19	40		September 24	34	Frost.	
1813	May 20	40		October 12	39		
1814	May 18	40		September 26	40		
1815	May 19	38		September 28	36		
1816	June 11	35	Frost.	August 22	40	Frost.	
1817	May 31	40		October 2	34	White frost.	
1818	May 20	38		September 27	40		
1819	May 28	38	Frost.	October 4	38		
1820	May 10	38		September 26	37	Frost.	
Mean 41 years,	May 19.1	38.7		September 22.2	38.1		

LAST FROST OF SPRING.				FIRST FROST OF AUTUMN.			
Years.	Date.	Temp.		Date.	Temp.		
1821	May 22	39	Frost.	September 27	40	Frost.	
1822	May 26	40		September 18	39		
1823	May 30	40	Frost.	September 22	37	Hard white frost.	
1824	May 26	39	Black frost.	September 24	38	Large frost.	
1825	May 16	39	Black frost.	September 11	40	Frost.	
1826	May 10	38		October 9	34	White frost.	
1827	May 13	40	Frost.	October 7	37	Frost.	
1828	May 9	40	Frost.	October 7	38		
1829	May 14	36	Frost.	September 12	40		
1830	May 22	40		September 17	39		
1831	May 10	35		September 30	39		
1832	May 25	33		September 10	39		
1833	May 4	40		August 30	40		
1834	May 17	38		August 29	39		
1835	May 23	39		September 15	39		
1836	May 31	40		September 7	38		
1837	May 9	38		September 13	40		
1838	May 15	38		September 24	38		
1839	May 12	40	White frost.	September 14	39	Slight frost.	
1840	May 26	40	White frost.	September 14	39	Frost.	
1841	May 16	39	Frost.	October 1	39	Frost.	
1842	May 21	33	Very heavy frost.	September 23	38		
1843	June 2	36	Heavy frost.	September 28	34	Severe frost.	
1844	May 22	40	Frost.	September 24	40	Frost.	
1845	May 31	35	Frost.	September 23	39		
1846	May 22	37	Frost.	September 29	39		
1847	May 6	37		September 16	37	Slight frost.	
1848	May 1	40		September 16	38	Severe frost.	
1849	May 7	37		October 2	39		
1850	May 22	39	Frost.	September 30	40		
1851	May 5	37	Snow and sleet.	September 15	36	Frost.	
1852	May 4	38		September 30	38		
1853	May 6	36		September 30	35	Frost.	
1854	May 8	40		September 21	36		
1855	May 20	39		September 20	33		
1856	May 30	36	Ice $\frac{1}{4}$ inch thick.	September 25	37		
1857	May 19	40		September 24	38	Frost.	
1858	May 29	37		August 24	40	Frost.	
1859	June 12	37		September 15	36		
1860	May 16	38	Frost.	September 10	40		
1861	May 30	37		October 14	37		
1862	May 29	38		September 3	37	Frost.	
1863	May 16	40		September 21	40		
1864	June 11	41	Slight frost.	September 26	40	Slight frost.	
1865	May 13	40	Frost.	September 20	39	Slight frost.	
Mean 45 years,	May 18.9	38.2		September 20.4	38.2		

Taking the average of the dates and temperatures for the two series of years before and after 1820, we obtain the following results :

	Date.	Temp.	Date.	Temp.
First series,	May 19.1	38.7	Sept. 22.2	38.1
Second series,	May 18.9	38.2	Sept. 20.4	38.2
Difference,	- 0.2	-0.5	- 1.8	+0.1

These numbers agree perhaps as well as could be expected upon the supposition that no permanent change of climate has occurred.

Another phenomenon which affords a standard for comparing different climates, is the time of occurrence of the first and last appearance of snow during the winter season. We have therefore made a careful comparison of all the meteorological journals, and have determined as accurately as possible the dates of these phenomena, together with the depth of the snow. The results are shown in the following table. Column 2d gives the date of the last snow in the spring of the year, the snow being sufficient in quantity to be measured, or to whiten the surface of the ground. Column 3d contains the date of the last recorded appearance of snow in quantities too small to be measured, being generally designated by 'a snow squall,' or 'a few flakes of snow.' Columns 4 and 5 contain similar information respecting the first appearance of snow in the autumn.

Year.	Last snow of winter.	Last flakes of snow.	First flakes of snow.	First snow of winter.
1778			Nov. 19	Dec. 10
1779	Apr. 18			Nov. 1
1780	Mar. 31			Nov. 21
1781	Apr. 2			Nov. 20, 3 inches.
1782	Mar. 11, 3 inches.			
1783	Mar. 22, 1 inch.		Nov. 11	Nov. 12, 3 inches.
1784	Apr. 11, 2 inches.			Dec. 10, 3 inches.
1785	Apr. 19, 1 inch.		Oct. 26, snow squalls.	Nov. 24, 1 inch.
1786	Apr. 2, 6 inches.			Oct. 30, 2 inches.
1787	Mar. 9, 2 inches.	April 21		Nov. 30
1788	Mar. 23	Mar. 28, snow squalls.		Nov. 26, 1 inch.
1789	Apr. 1	Apr. 21	Nov. 4	Dec. 3, 1 inch.
1790	Apr. 28, 1 inch.		Nov. 7	Nov. 27, 6 inches.
1791	Apr. 14		Oct. 17	Nov. 3, 4 inches.
1792	Mar. 16, 3 inches.			Nov. 23
1793	Mar. 21		Oct. 29	Nov. 13
1794	Mar. 6		Nov. 12	Nov. 14, 3 inches.
1795	Mar. 31		Nov. 23, snow squalls.	Dec. 3
1796	Mar. 18, 4 inches.			Dec. 2
1797	Apr. 18, 3 inches.			Nov. 17
1798	Apr. 3	Apr. 16, snow squalls.	Oct. 31	Nov. 1, 2 inches.
1799	Apr. 2	May 12, snow squalls.	Nov. 3	Dec. 1, 1 inch.
1800	Apr. 14	Apr. 14	Nov. 14	Nov. 21
1801	Apr. 10			Nov. 21, 1 inch.
1802	Mar. 29		Nov. 1	Nov. 3
1803	Mar. 31	May 8	Nov. 10	Dec. 15, 1 inch.
1804	Mar. 30, $\frac{1}{4}$ inch.		Nov. 12, snow squall.	Dec. 4, 2 inches.
1805	Feb. 28, 1 inch.	Mar. 12, slight.	Nov. 20	Nov. 24, $\frac{1}{2}$ inch.
1806	Apr. 8, 1 inch.	Apr. 15	Nov. 16	Dec. 3, 4 inches.
1807	Mar. 31, 1 inch.	Apr. 13	Oct. 27	Dec. 15, $\frac{1}{2}$ inch.
1808	Mar. 15, 1 inch.	Apr. 9	Nov. 15	Dec. 24, $\frac{1}{2}$ inch.
1809	Mar. 15, 2 inches.	Apr. 26	Nov. 9	Nov. 20, 1 inch.
1810	Mar. 26, 5 inches.	Apr. 1	Oct. 23	Oct. 31, $\frac{1}{2}$ inch.
1811	Apr. 11, 4 inches.		Oct. 26	Nov. 20, $\frac{1}{2}$ inch.
1812	Apr. 13, 2 inches.			Dec. 2, 2 inches.
1813	Mar. 16, 1 inch.			Nov. 14, $\frac{1}{2}$ inch.
1814	Mar. 21, 5 inches.		Nov. 19	Nov. 27, $\frac{1}{2}$ inch.
1815	Mar. 29, 1 inch.		Dec. 12	Dec. 30, 9 inches.
1816	Apr. 11, 1 inch.			Dec. 9
1817	Mar. 28, 2 inches.			Nov. 22, 1 inch.
1818	Mar. 28, 2 inches.	Apr. 21, snow squalls.	Nov. 18	Dec. 1, 2 inches.
1819	Mar. 16, 4 inches.	Mar. 19	Oct. 25	Nov. 28, 2 inches.
1820	Apr. 2, 1 inch.	Apr. 7		Nov. 12, 9 inches.
Mean 42 years,	March 29.7	April 13.1	Nov. 8.1	Nov. 24.4

Year.	Last snow of winter.	Last flakes of snow.	First flakes of snow.	First snow of winter.
1821	Apr. 17, 3 inches.		Nov. 13	Nov. 30
1822	Mar. 8		Nov. 26, snow squall.	Dec. 3, 1 inch.
1823	Mar. 30, 8 inches.		Oct. 26	Nov. 25
1824	Mar. 18, 3 inches.		Oct. 24	Dec. 4
1825	Apr. 3			Nov. 20
1826	Apr. 10		Nov. 4, a few flakes.	Nov. 23
1827	Mar. 20	Mar. 21, snow squall.		Nov. 7, 1 inch.
1828	Mar. 15, 6 inches.	Apr. 13, snow squalls.		Nov. 14
1829	Mar. 22, 3 inches.	Apr. 11		Nov. 14, 1 inch.
1830	Mar. 26, 4 inches.			Nov. 30
1831	Mar. 19			Dec. 1
1832	Apr. 3			Dec. 1
1833	Mar. 11			Nov. 25
1834	Mar. 24, slight.	Apr. 27	Nov. 16, a few flakes.	Dec. 13
1835	Apr. 16	Apr. 25		Nov. 23, 4 inches.
1836	Mar. 29		Nov. 3	Nov. 29
1837	Mar. 5			Nov. 14
1838	Apr. 14		Oct. 31	Nov. 18
1839	Mar. 3, 1 inch.	Apr. 14	Nov. 10, snow squall.	Nov. 20, light.
1840	Apr. 1		Oct. 25	Nov. 19, 2 inches.
1841	Apr. 14, 8 inches.		Oct. 3	Nov. 8, 1 inch.
1842	Mar. 24, 2 inches.			Nov. 24
1843	Apr. 5	Apr. 19	Nov. 7	Nov. 8
1844	Mar. 31, $\frac{1}{2}$ inch.		Nov. 24, snow squall.	Nov. 28, 2 inches.
1845	Apr. 7, 1 inch.	Apr. 11, snow squalls.	Nov. 17, a few flakes.	Nov. 30, 1 inch.
1846	Mar. 6, 1 inch.	Apr. 13, snow squalls.	Oct. 29	Nov. 25, 1 inch.
1847	Apr. 2, 2 inches.	Apr. 13, snow squalls.	Nov. 25	Dec. 16, $\frac{1}{2}$ inch.
1848	Apr. 19, 5 inches.		Nov. 9	Nov. 12, 6 inches.
1849	Mar. 27, 3 inches.	Apr. 19, flurries of snow.		Dec. 2, 1 inch.
1850	Apr. 13			Nov. 18, $\frac{1}{2}$ inch.
1851	Apr. 20, 5 inches.	May 5, snow and sleet.	Nov. 4, a few flakes.	Nov. 25, 1 inch.
1852	Apr. 6, 8 inches.	Apr. 13, snow squalls.		Dec. 13
1853	Apr. 17			Dec. 23
1854	Apr. 17			Dec. 3
1855	Mar. 26			Nov. 21
1856	Mar. 24	Mar. 28	Nov. 15	Nov. 29
1857	Mar. 11	Apr. 20	Nov. 21, slight.	Dec. 5
1858	Mar. 8	Mar. 11	Nov. 14	Nov. 28
1859	Mar. 8		Nov. 14	Nov. 28
1860	Mar. 22	Apr. 26		Dec. 4
1861	Apr. 3			Nov. 15
1862	Apr. 9, $\frac{3}{4}$ inch.			Nov. 7, 2 inches.
1863	Apr. 8, $\frac{1}{2}$ inch.			Dec. 11, 3 inches.
1864	Mar. 23, $\frac{1}{2}$ inch.		Nov. 5, snow squall.	Dec. 10, 3 inches.
1865	Mar. 2, $\frac{1}{2}$ inch.	Mar. 24, snow squalls.		Dec. 7, 2 inches.
Mean 45 years,	March 28.1	April 12.2	Nov. 7.8	Nov. 26.3

The slight differences between the average dates in the two series of observations are sufficiently explained by the loose manner in which many of the journals were kept, without supposing any permanent change of climate during the interval.

The time of flowering of fruit trees also affords important information respecting the character of a climate. We have therefore prepared the following table, indicating, as far as could be ascertained, the time of flowering of six of the most common fruit trees.

Time of flowering of fruit trees.

Year.	Apricot.	Peach.	Cherry.	Plum.	Pear.	Apple.
1779		April 14				
1780						May 10
1781		May 3			May 6	
1782					May 3	
1783		April 29		April 29		
1784						May 11
1785		May 8				May 19
1786		May 5		May 5	May 5	May 10
1787		April 29			April 30	May 6
1788						May 5
1789		May 18		May 18	May 24	May 29
1790		May 9				May 17
1791		May 2			May 4	May 13
1792		April 28				May 1
1793		April 21				May 5
1794		April 15		April 15		May 6
1795		April 30				May 10
1796		April 28				May 3
1797		May 2				May 12
1798		April 30				May 4
1799		May 8				May 15
1800		April 26				May 6
1801		May 1				May 6
1802		April 30				May 5
1803		April 22				May 5
1804		May 7				May 14
1805	April 16	April 18	April 20			May 6
1806	May 1	May 6				May 20
1807	May 1		May 10			May 19
1808	April 24	April 28	April 29			May 10
1809	May 3	May 13	May 11			May 24
1810			May 1			May 11
1811	April 20		April 30			May 7
1812	May 6	May 20				June 1
1813						May 19
1814	April 28	May 4				May 10
1815	April 26					May 23
1816		May 3				May 20
1817						May 11
1818	May 8	May 20			May 25	May 27
1819						May 23
1820						May 7
Mean,	April 28	May 19	May 2	May 2	May 9	May 12.7

Time of flowering of fruit trees.

Year.	Apricot.	Peach.	Cherry.	Plum.	Pear.	Apple.
1821						May 17
1822		May 5	May 5			May 9
1823	April 29	May 14	May 14		May 17	May 19
1824		April 30	May 1	May 2	May 5	May 11
1825	April 11	April 20	April 20		April 27	May 1
1826						May 7
1827	April 9	April 23		April 22	April 22	May 8
1828		April 28	May 8		April 28	May 8
1829		May 8				May 11
1830		April 22				May 2
1831						May 2
1832		May 12				May 15
1833						May 5
1834		April 17	April 17			May 5
1835			May 9			May 24
1836			May 14			May 14
1837						May 23
1838		May 16	May 17		May 20	May 21
1839	April 19	April 26	April 26			May 6
1840	April 19		April 26			May 1
1841		May 13	May 13			May 20
1842		April 16	April 17		April 23	May 4
1843		May 8	May 15		May 15	May 18
1844		April 25	April 25	April 27	May 3	May 6
1845		April 29	April 29	April 29	May 6	May 6
1846		April 30	April 30	April 30	May 6	May 6
1847		May 7		May 7		May 21
1848		May 1	May 1	May 6		May 11
1849		May 8	May 4	May 14	May 17	May 20
1850		May 6	May 8		May 12	May 22
1851		May 5				May 14
1852		May 11				May 20
1853		April 29	April 30			May 12
1854		April 25				May 6
1855	April 28	May 4	May 6			May 11
1856			May 9	May 3		May 12
1857			May 12			May 21
1858		May 6				May 13
1859			May 4			May 7
1860		May 4	May 5			May 16
1861					May 13	May 15
1862			April 29			May 10
1863		May 10				May 14
1864	May 1	May 6	May 8	May 7	May 13	May 17
1865	April 18	April 29	May 1	April 30	May 4	May 12
Mean,	April 21	May 2.3	May 4	May 2	May 7	May 12.1

The average results for the two series of years preceding and following 1820, are as follows:

	Apricot.	Peach.	Cherry.	Plum.	Pear.	Apple.
First series,	April 28	May 1·9	May 2	May 2	May 9	May 12·7
Second series,	April 21	May 2·3	May 4	May 2	May 7	May 12·1
Difference,	- 7	+ 0·4	+ 2	+ 0	- 2	- 0·6

The number of observations of the apricot is too small to afford a reliable average, and moreover this tree frequently shows a few blossoms a full fortnight before the time of general flowering. But little importance therefore is attached to these observations of the apricot. For the five remaining trees the times of flowering before and since 1820 agree remarkably well, especially for the peach and apple, for which the observations are most numerous; and since the differences for these two trees are not only small but have contrary signs, we must conclude that in the temperature of spring there has been no appreciable change within the past 86 years.

If we bring together the principal results of the last three tables, we shall more readily perceive their bearing upon the question of permanence of climate. The following table exhibits the most important results.

	First series.	Second series.	Difference.
Last snow of winter,	March 29·7	March 28·1	-1·6
Peach trees in blossom,	May 1·9	May 2·3	+0·4
Apple trees in blossom,	May 12·7	May 12·1	-0·6
Last frost of spring,	May 19·1	May 18·9	-0·2
First frost of autumn,	Sept. 22·2	Sept. 20·4	-1·8
First snow of winter,	Nov. 24·4	Nov. 26·3	+1·9

The differences between the two series of observations, as shown in the last column, are sometimes positive and sometimes negative; the average of all the differences being negative, and amounting to not quite one-third of a day.

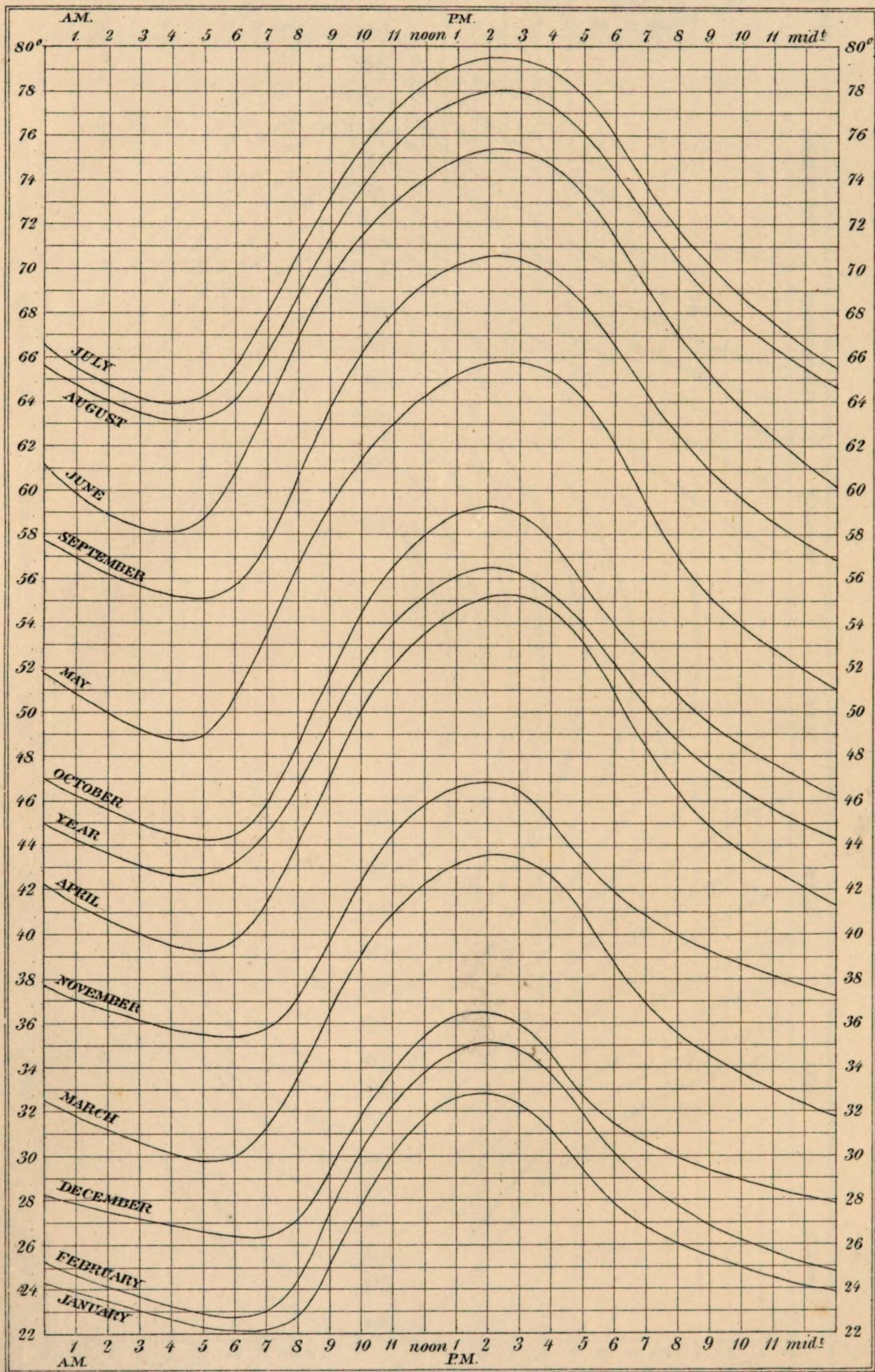
When we consider that the observations which are here compared were made by more than twenty different persons, without concert and without any uniform system of observation; that the subjects of observation are in their very nature somewhat indefinite; and that many of these records were casually made without any idea that special importance would ever be attached to them; we must admit that the small discrepancy of one-third of a day may have resulted from the want of uniformity in the system of observations, without implying the slightest permanent change in the character of our climate.

We conclude therefore, finally, that during the past 86 years there has been no permanent change at New Haven either in the mean temperature of the year, or in that of any of the separate months; and that there has been no permanent change in the average date of occurrence of the last frost of spring, or the first frost of autumn—of the first snow of winter, or the last snow of winter—or in the average date of flowering of fruit trees, such as peach, cherry, etc.

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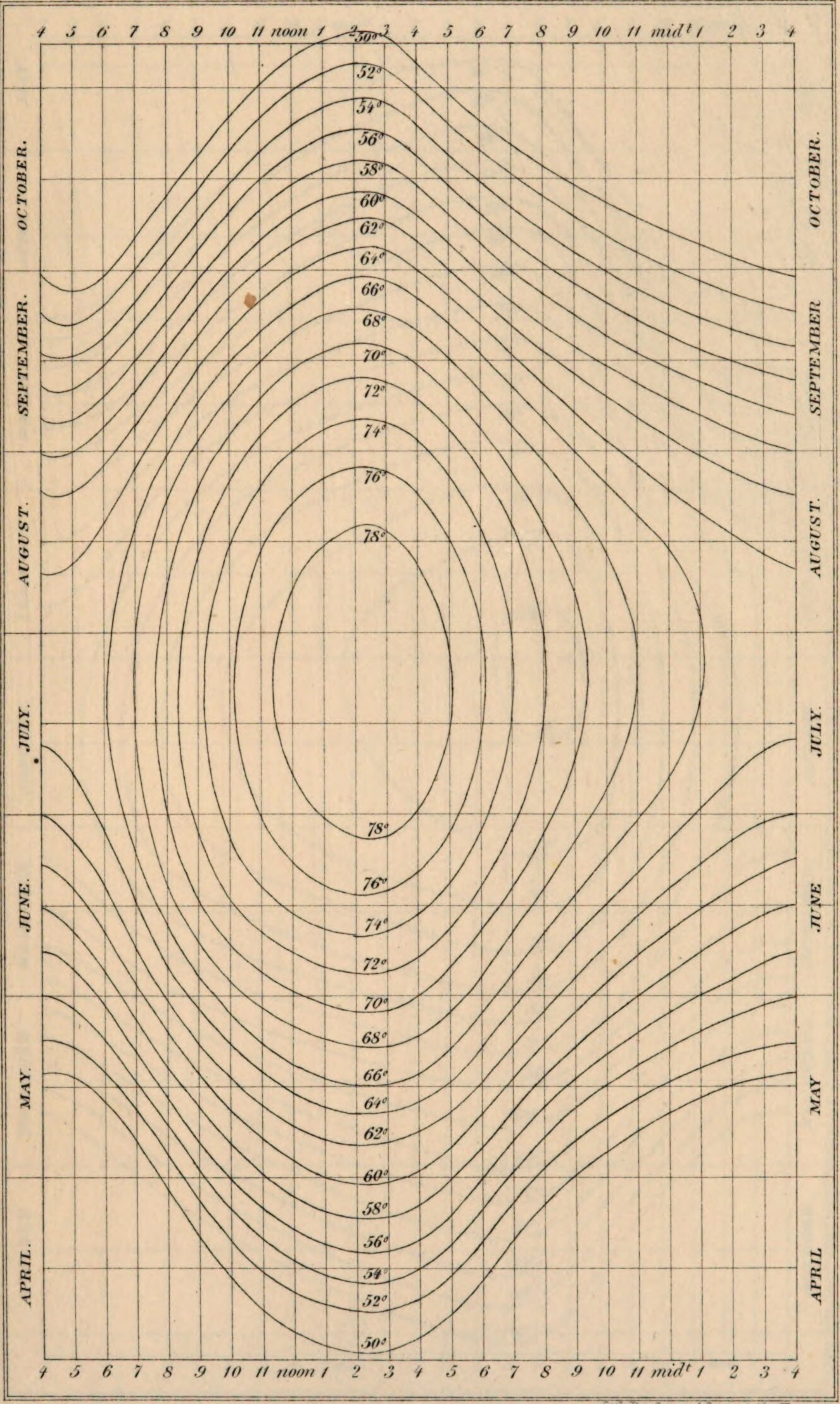


May 1892

1892

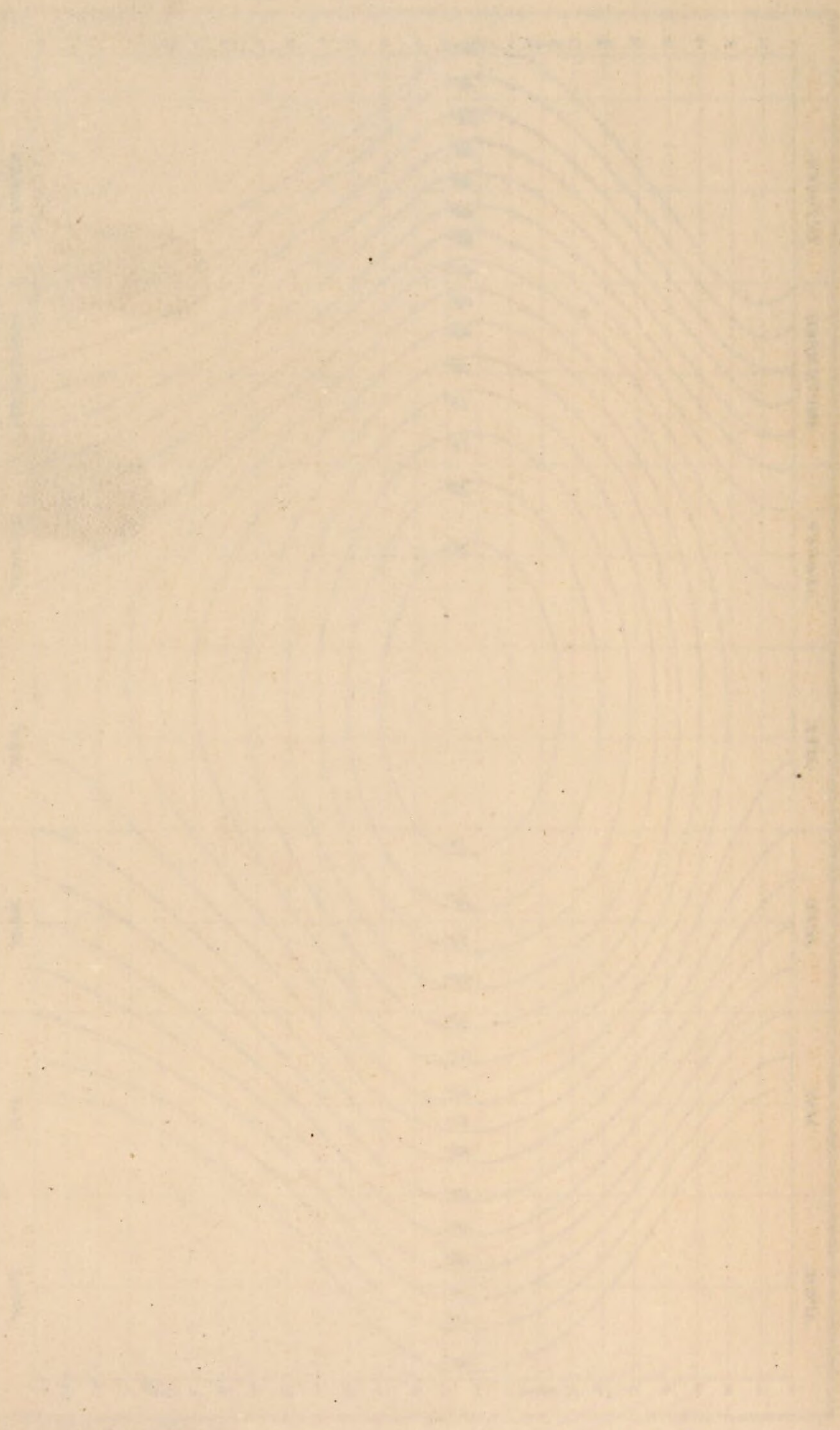


PLATE II. Chrono-Isothermals. Between the highest and the mean temperature.



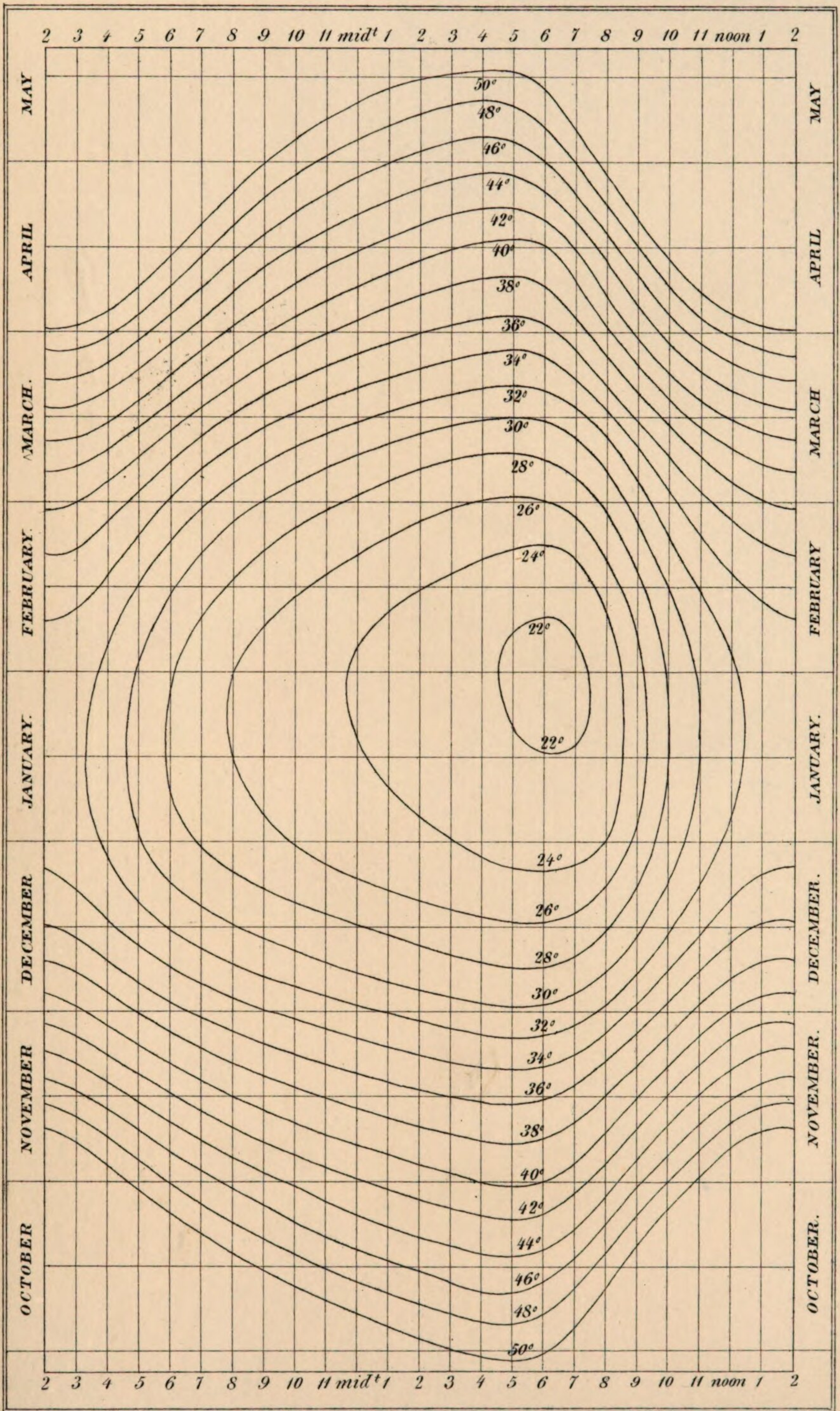
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PLATE III. Chrono-Isothermals. Between the lowest and the mean temperature.



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1871

1872

1873

1874

1875

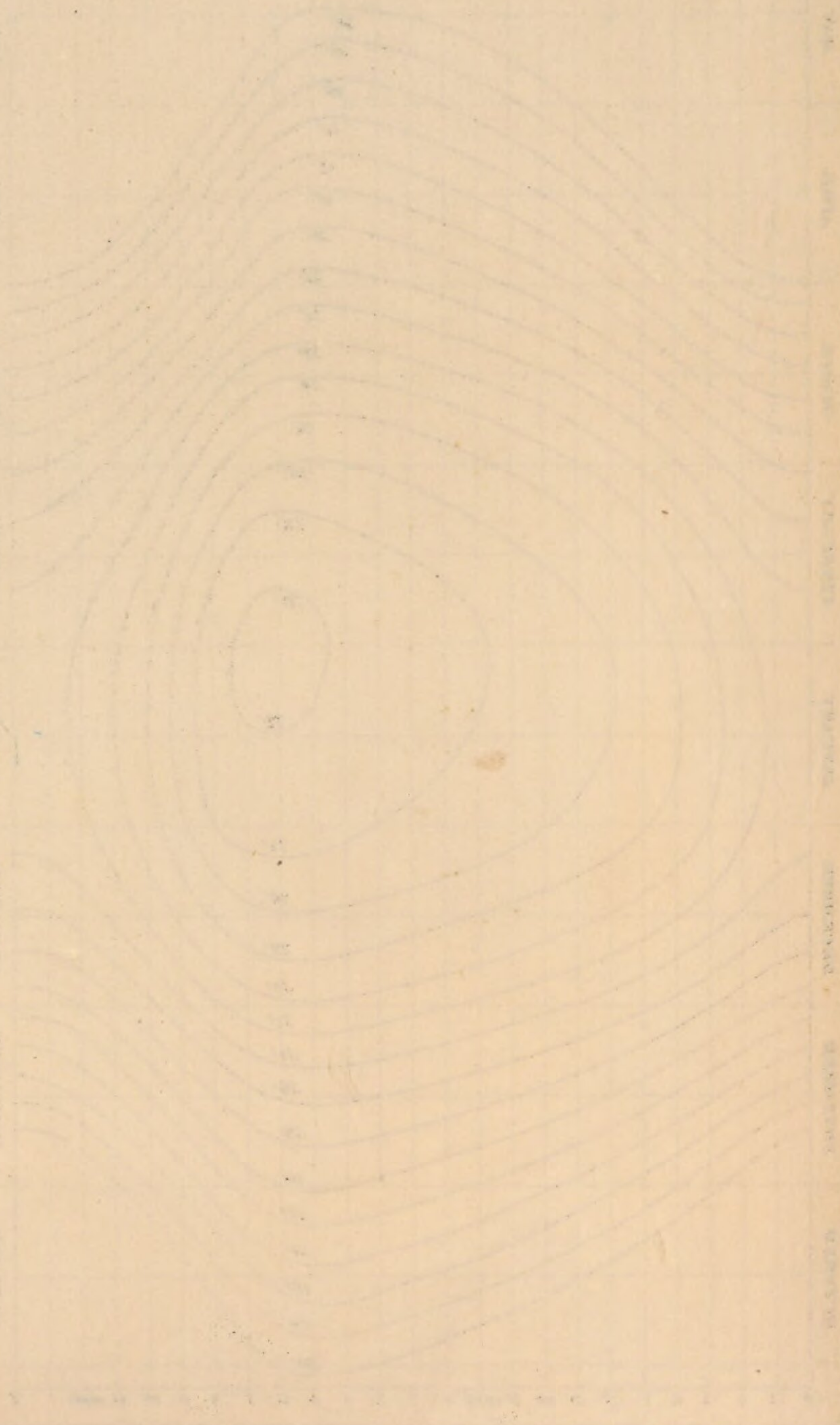
1876

1877

1878

1879

1880



1881

1882

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1884

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1890

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